

**SUPPLY CHAIN MANAGEMENT: A HUMAN RESOURCES
PERSPECTIVE IN A SOUTH AFRICAN AUTOMOTIVE
MANUFACTURING ORGANISATION**

by

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I declare that **“SUPPLY CHAIN MANAGEMENT: A HUMAN RESOURCE PERSPECTIVE IN A SOUTH AFRICAN AUTOMOTIVE MANUFACTURING ORGANISATION”** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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ABSTRACT

This study attempts to examine and comprehend the connection between human resources management (HMR) practices and effective supply chain management (SCM) implementation by means of a conceptual framework and construct developed through a literature study and previous studies conducted in this area. The focus of this study was to determine whether a South African automotive manufacturer, implements identified human resources practices and to establish to what extent these practices enhance effective supply chain management implementation. A quantitative research approach was used to conduct this study. A census survey was used to collect data. Electronic data was collected using a monkey survey, and paper-based questionnaires were collected by the researcher at the participating organisation. Seven hypotheses were formulated to guide this study. The data analysis of this research was done for the purpose of testing these hypotheses and achieving the empirical research objectives.

The findings from descriptive statistical analysis summarised the strong HR practices which facilitate the implementation of effective supply chain management in the participating automotive manufacturing organisation, and also focused on weak HR practices which might hinder the implementation of effective supply chain management. Some areas in which improvement is possible were identified. By taking into account that this study focused on one leading South African automotive manufacturer, further research is recommended with an expansive scope of South African automotive manufacturing organisations.

The study aimed to provide recommendations on the adoption of human resource management practices for the purpose of facilitating the implementation of an effective supply chain management. It is of crucial value for the participating South African automotive manufacturing organisation to apply the study's findings (The South African manufacturer should revise its compensation practices by ensuring that compensation is comparable to what other employees in similar jobs elsewhere are being paid, and it should also provide a sociable and transparent working environment to its workers).

Keywords: Human resource management; human resource practices; supply chain management; implementation; effectiveness.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION TO THE STUDY

Supply chain management is currently a familiar management term (Bharthvajan, 2014: 10163). Although supply chains have been in existence in industries for many years, it is only in the last decade that supply chain management has begun to be viewed and treated as a strategic component of business management. Today's increasingly complex business environments, which are characterised by shorter product life-cycles, product proliferation, ongoing outsourcing, and the globalisation of the supply base and markets, magnify the challenges of human resource management in supply chain settings (Vereecke, 2012). This dynamic environment requires effective communication at interpersonal, as well as working level, team management, and constant lifecycle innovation (Rao & Raju, 2015: 643). Human factor insight in these areas are critical for the effective development of global process networks. Effective human resource management is a critical element of successful organisational operations in supply chains. (Anastasiou, 2012: 1). Lojić, Škrbić and Ristić, (2012: 2) agree that human resources and effective management of this resource, is of strategic interest to provide organisations a competitive advantage over rivals. Strategically managing human resources in the supply chain, requires human resource configurations and modernised human resource development which adapts to the broader organisational strategy (Rao & Raju, 2015: 643). Thriving organisations exhibit innovation, efficiency, a flexible structure and understand the necessity of new skills in their organisations and in their human resources functions and practices (Anastasiou, 2012: 1).

1.2 BACKGROUND TO THE STUDY

1.2.1 REASONS AND BENEFITS ASSOCIATED WITH THE ADOPTION OF SUPPLY CHAIN MANAGEMENT

Due to globalisation, technological changes and an ever-changing dynamic environment, competition is currently fiercer than before. As reported by Watson (2014), the very nature of competition has changed. Organisations no longer compete against organisations, but supply chains compete against other supply chains for supremacy (Naude & Badenhorst-Weiss, 2012: 92). According to Vereecke (2012), the globalisation of organisations, characterised by increased outsourcing, has firmly placed the spotlight on supply chains. One reason for the increased interest in supply chain management is that organisations progressively find themselves reliant upon effective supply chains, or networks, to successfully compete in the global market economy (Lambert, 2008: 1). Other potential benefits of efficient supply chain management include improvements in returns on investment (ROI) and returns on assets (ROA). Furthermore, it has the purpose of improving the long-term performance of individual organisations and the supply chain as a whole (Fisher, Graham, Vachon & Vereecke, 2010: 814). The Supply Chain Foresight (2013: 4) asserted that in order to thrive in today's volatile global marketplace, organisations need to continually reinvent themselves to meet new challenges in order to retain and gain a competitive advantage. This requires them to be agile, flexible and responsive and to drive continual innovation in their business and their supply chains.

1.2.2 SUPPLY CHAIN MANAGEMENT: IMPLEMENTATION ISSUES

Despite the attention given to supply chain management, many South African manufacturing organisations are still struggling with its implementation due to some issues related to human resource practices. A research study conducted by Kumar (2013) stated that when it comes to managing supply chains, South Africa is considered as one of the best amongst the BRICS

nations, but the country still lags far behind the developed nations. This research study postulates numerous challenges which affects South African competitiveness in terms of supply chains. These include: mode of transport used, the lack of skills (under-skilled employees) and inadequate technology. With regards to technology, it is not always optimally used, for example 'track and trace' in the logistics sector. South Africa does not use information technology to optimise their supply chain behaviour. According to Watson (2014), these issues pose a great challenge when it comes to achieving supply chain efficiency. Dey (2014) reported on another study (conducted by Heyns and Luke in 2012) that it has been acknowledged that one of the key constraints to supply chain management is the shortage of suitably qualified supply chain management staff, which poses a threat to both competitiveness and economic growth prospects. The South African Department of Labour in particular needs to be able to identify these skills shortages and apply urgent and relevant intervention to resolve a situation that has now reached a critical point in terms of skills shortage (Heyns & Luke, 2012: 109). The findings in the studies discussed above might disclose weaknesses in human resource practices in South African supply chains.

1.2.3 RELEVANCE OF HUMAN RESOURCE PRACTICES IN SUPPLY CHAIN MANAGEMENT

Despite the realisation that managing supply chains effectively can provide a crucial competitive advantage, there appears to be insufficient realisation that this rests on human performance (Supply Chain Forum, 2012: 2). Although it is important to develop viable supply chain management strategies and plans, the execution of these schemes is dependent on the employees who are involved (Swart, Hall & Chen, 2012: 11).

A review of academic literature has revealed that little research has been done on the relationship between human resource management practices and supply chain management (Shub & Stonebraker, 2009: 32; Vlerick Business School, 2012). Like supply chain management, human resource management is characterised as a potentially important, yet under-utilised source of competitive advantage for organisations (Mutsuddi, 2012: 54). Given the importance of supply

chain management in organisations, it becomes imperative to understand all practices of human resources that can help in improving the performance of the supply chain (Pandey, Bhattacharyya & Khaur, 2012: 114). Furthermore, integration of human resource and supply chain management strategies will increase the supply chain's performance (Pandey, *et. al.*, 2012: 114). The correct use of human resource practices indicates a significant investment in human capital (Khan, Taha, Ghouri, Khan and Yong, 2013: 178).

This study focused on the significance of human resources practices in supply chain management. This study emulated studies done by Koulikoff-Souviron and Souviron (2007) conducted in the USA, as well as studies conducted amongst small businesses in Pakistan by Khan, *et al.*, (2013), wherein six dimensions of human resource management practices were identified. These dimensions were used as guidelines to determine how human resource practices affect the implementation of effective supply chain management in a South African automotive manufacturing organisation. Despite using the dimensions of the other studies, the researcher developed her own questionnaire from the literature studies, taking local circumstances into consideration.

1.2.4 THE AUTOMOTIVE INDUSTRY AND SUPPLY CHAIN

The empirical study was conducted in a South African automotive organisation. The automotive industry is perceived to be the most advanced in supply chain management practices in South Africa (Ambe & Badenhorst, 2013: 1). The South African automotive industry is a truly global industry (Tolmay & Badenhorst-Weiss, 2015: 2), as it forms an important part of international supply chains and is increasingly integrated into the global automotive environment (Automotive Export Manual, 2016). The South African automotive industry is part of a global producer-driven value chain which is controlled and coordinated by multinational original equipment manufacturers (OEMs) (Comrie, Terreblanche, Johnson, Snyman & Kirby, 2013: 6). OEMs in South Africa include BMW, Ford, Nissan, Volkswagen, Toyota and Mercedes Benz, and they are the biggest and most powerful parties in the South African automotive supply chains (Automotive Industry Export Council, 2014). The automotive industry, and thus the

automotive supply chains, consist of the world's leading automobile component manufactures (ACMs), OEMs, logistics and distribution organisations, as well as retailers, to blend the demand chain with the supply chain (Ambe & Badenhorst- Weiss, 2011a: 349).

The automotive industry is an important contributor to the South African economy (Ambe & Badenhorst-Weiss, 2011b: 13389). South Africa has a globally integrated market-oriented economy with a Gross Domestic Product (GDP) of R3991 billion (The Automotive Export Manual, 2016: 26). The manufacturing sector, which the automotive manufacturing is part of, is important to support sustainable growth in the country and it possesses the highest growth and employment multipliers of all the country's economic sectors (The Automotive Export Manual, 2016: 6). The broader automotive industry, through its well-integrated value chain from downstream to upstream activities, contributed 7,5 % to the country's GDP in 2015 (The Automotive Export Manual, 2016: 6). In addition to that, it was reported that the vehicle and automotive component manufacturing industries accounted for 33,5 % of the country's total manufacturing output, while record automotive export earnings of R151,5 billion in 2015, a substantial increase of 30,9% from the R115,7 billion in 2014, comprised a significant 14,6 % of South Africa's total export earnings.

The automotive industry has embraced technology and management practices which transformed the manufacturing environment by using cutting-edge design and visualisation tools. However, the industry has fragilities and faces new and emerging supply chain challenges (Ambe & Badenhorst-Weiss, 2013: 1). Because of intensified competition in the global market, the introduction of products with shorter lifecycles and a growing need for customer service, vehicle manufacturers in South Africa have been forced to invest in and direct their attention to the supply chains and supply chain management (Simchi-Levi; Kaminsky & Simchi-Levi 2009: 1). The competitiveness, and the struggle for survival, of the automotive industry has never been as prominent as in the last few years (Naude & Badenhorst-Weiss, 2011: 279). Hence, understanding the trends and challenges in automotive supply chain, are not only paramount for supply chain management practitioners, but also for South Africa as a whole (Ambe & Badenhorst-Weiss, 2011a: 338). Therefore, appropriate supply chain strategies are required to take the automotive industry to a new level (Ambe & Badenhorst, 2011a: 339).

Although it is important to develop viable supply chain management strategies and plans, the execution of these schemes is dependent of the employees who are involved (Swart, Hall & Chen, 2012: 11).

1.3 BACKGROUND TO THE RESEARCH PROBLEM

In only two decades, supply chain integration has penetrated global manufacturing and distribution systems, permitting competitive advantages for organisations that adopt this approach (Shub & Stonebraker, 2009: 31).

While many organisations recognise the importance of strategically managing their supply chains, they are less likely to grasp that successful supply chain management rests on the performance of people in the supply chains (Fisher, *et al.*, 2010: 814). Many organisations focus their attention on improving and investing in technology and infrastructure and neglect to dedicate the same focus to the people that manage and operate the supply chain (Cedeño, Farrero & Tarrés, 2015: 130). Managing human resources for competitive advantage is not new, and for many years across most organisations, managers have identified their employees as their organisation's most valuable asset (Fawcett, Ellram & Ogden, 2007: 438). Although managers often talk about the importance of people, relatively few live up to their own rhetoric. They focus on technology rather than people, by having this tendency of viewing technology as the solution rather than an enabler. Technology is unquestionably critical for an effective supply chain, but technology has its limitations in serving the bigger organizational success (Wipro, 2011: 3). Human resource is the backbone of every organisation's performance, likewise, in supply chain management (Deboonme, 2012: 3; Supply Chain Strategy, 2011; Khan, *et al.*, 2013: 177). So it is imperative to comprehend that without satisfactory performance of qualified and capable employees, supply chain strategies are difficult to implement successfully (Swart, *et al.*, 2012: 10).

As previously indicated, studies found that the South African supply chain management environment lacks the necessary human resources skills. South African organisations show

reluctance to aggressively implement appropriate work-based training/experiential learning programmes at this time, which in turn hampers their competitiveness (Dey, 2014). As claimed by SAPICS (2014a), integrating human resource management with supply chain management is critical to ensuring that the desired skills are identified and plans are made to develop them. Developing personnel in line with supply chain management best practice, is imperative in achieving strategic organisational goals, owing to the fact that successful management of both organisations and supply chains rests on the performance of people. Supply chain management training remains the most critical discipline in building capacity and ensuring South African's competitiveness and sustainability in the global context (SAPICS 2014b; Buuren & Wessels, 2014: 1). Hohenstein, Feisel and Hartmann (2014: 434) mentioned that, today's increasing globalisation and the associated growing demand for talented supply chain managers, human resource management in supply chain management has emerged as a top priority for organisations. In order to achieve supply chain excellence, some studies contend that acquiring and developing the right supply chain management talent is the first component of supply chain transformational strategy implementation (Dittmann, 2012; Slone, Dittmann & Mentzer, 2010).

With regards to the South African automotive industry, the deficiency of specialised technical skills hampers the industry's ability to becoming globally competitive (AIDC, 2016: 3). The availability of skills in the vehicle and component manufacturing industry in South Africa, remains a critical determinant of the sustainability of the industry (Tech Pro, 2014).

The following also provides evidence of human resource shortcomings in supply chain management:

- **Supply chain talent gaps:** According to Hohenstein, *et al.*, (2014: 434), talented human resources in supply chain management offer a unique source of sustainable competitive advantage by improving supply chain performance (Ellinger & Ellinger, 2014). Based on the 2012 Supply Chain Skills Gap conducted by Heyns and Luke (2012) in South Africa, it was revealed that the skills gap has widened considerably, which consequently affects the competitiveness of the South African economy. South Africa's automotive industry may not currently be in serious

trouble, but its current situation is not sustainable, with a widening skills gap and fierce international competition remaining key challenges (Talane, 2012: 1).

- **Supply chain talent profession dynamics:** South Africa's growing skills gap is intensified by an inability to develop new supply chain talent, primarily owing to a failing government education system (Tech-Pro, 2014). South Africa's National Development Plan echoes this sentiment by highlighting poor education outcomes, at all levels, as one of the major impediments to creating an economy able to respond to the challenges of the 21st century (Comrie, *et al.*, 2013: 58). It also highlights the need to produce more engineers and artisans, as well as to improve technical vocational training in order to better meet the needs of the manufacturing industry.
- **Potential business faculty shortages:** Low enrolment and pass rates deters South Africa to create the academic talent needed to develop supply chain skills. Even though the unemployment rate in South Africa remains high, employers are finding it difficult to find the right people for the appropriate position. Shay (2014) estimates that 25% of students enrolled in a Bachelor's degree do not pass their first year, while only a third will graduate within three years, and half will not graduate at all. There are at least 50 000 technical vacancies in the South African automotive industry which cannot be filled, due to the fact that there are not enough people with the minimum educational requirements (Talane, 2012: 2).

Based on the evidences stated above, it depicts an alarming concern for human resource management in South African supply chains. This study attempted to gain insight into the human resources practices which are appropriate to supply chain management improvement in a South African automotive manufacturer.

1.4 PROBLEM STATEMENT

Various previous studies have provided conceptual and empirical evidence of the need for suitable and skilled human resources in supply chain management. Although the lack of enough suitable and skilled human resources is caused by many factors beyond the control of individual organisations, they may improve the situation by focusing on effective human resource practices for the appointment of suitable personnel, upskilling, development and retention of personnel in the internal supply chain. However, limited academic studies have been conducted in South Africa on the pertinence of human resource practices in supply chain management in the manufacturing environment.

1.4.1 PREVIOUS STUDIES ON HUMAN RESOURCES IN SUPPLY CHAIN MANAGEMENT

A number of studies have reported some significant improvements in terms of their performance when applying purposeful human resources practices to their supply chains. However, as far could be ascertained, no studies were previously done in South Africa to determine the link between human resource management and supply chain management implementation effectiveness. These international studies are useful for gaining insight into the influence, or relationship, between human resource management and supply chain management.

Table 1.1: Previous studies on human resources in supply chain management

RESEARCHERS	SECTORS	FINDINGS AND RECOMMENDATIONS
Othman and Ghani (2008)	Automotive industry, food industry and printed circuit board manufacturer.	<p>Findings: Provided evidence that there was a positive relationship between purposeful and appropriate human resource practices and the supply chain management success.</p> <p>Recommendations: The adoption of supply chain management needs to be supported by specific human resource management practices.</p>
Khan, <i>et al.</i> (2013)	Small and medium sized enterprises (SME)	<p>Findings: Results revealed that supply chain management success is activated by human resource management practices such as: training, evaluation and compensation.</p> <p>Recommendations: They suggested that SME owners/ managers should focus on enhancing the supply chain management success by integrating appropriate human resource management practices. This integration will allow mapping unique strategies to gain an edge over competitors.</p>
Menon (2012)	US manufacturing organisations	<p>Findings: This Delphi study found that specific human resource practices, such as job descriptions and teamwork training, are important for successful supply chain integration. The result of the regression analysis indicated that flexible job description, team organization, teamwork training and the use of performance metrics to determine rewards, are significantly related to satisfaction with supply chain performance.</p> <p>Recommendations: Flexible job descriptions, the use of teams to coordinate activities internally with other departments, and training in teamwork skills are significant drivers of satisfaction with regard to delivery performance. While practices such as training in partner selection and training in partner evaluation helps with integration by</p>

		the inclusion of desirable partners, it is training in teamwork skills that help employees in their day-to-day interactions within the organisation and with partners to positively influence SC performance satisfaction with regards to cost and suppliers.
Swart, et al. (2012)	Manufacturing organisations	<p>Findings: They found that human resource management practices can help organisations achieve and maintain superior human performance in the supply chain.</p> <p>Recommendations: They suggested that future supply chain management research should incorporate human performance as an important construct.</p>
Pandey, et al., (2012)	Automobile manufacturing organisations	<p>Findings: The findings indicated that information sharing has a significant effect on supplier chain integration, and the relationship between these two variables is found to be positively moderated by “training” and “reward alignment”, while “collaborative performance” systems does not emerge as a significant moderator in the proposed relationships.</p> <p>Recommendations: HR practices, such as reward alignment (for motivating the employees to work for a common goal) and training (for providing the employees the necessary skill set to work in a highly interdependent environment with collaboration), will improve the relationship between information (IS) and supply chain integration, thus bringing out the importance of human resource in the area of operations.</p>

Koulikoff-Souvion and Harrisson (2010)	Large European pharmaceutical organisation	<p>Findings: The results showed that interdependent operations requires an human resource system that is designed to invest heavily in the relationships and aimed all employees involved in the interaction of the intra-firm supply chain, not just top management. Another interesting finding was that HR practices could have positive and negative effects on collaborations and integration. The effects will remain negative, if human resource practices are implemented with specific and distinct goals among functional areas, causing internal disputes, and not focusing on the overall performance of the supply chain.</p> <p>Recommendations: The authors proposed to supply chain managers: (a) a focus on employees and jobs related to broad supply chain rather than local optimization, (b) encouraging information and knowledge sharing and relational abilities that allow employees to leverage value, and (c) collective reward systems that support achieving mutual and interdependent goals.</p>
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Previous studies revealed a strong correlation between human resource management and supply chain management. However, as mentioned above, as far as could be ascertained, no studies were previously done in South Africa to determine the link between human resource management and supply chain management implementation effectiveness. As stated in paragraph 1.3 above, previous studies found that the South African environment lacks the necessary human resources skills. The human resource management practices adopted in this study were utilised in response to these issues.

1.5 RESEARCH QUESTION

In light of the above discussion of literature, the following question was regarded as the essence of this study, and can also be regarded as the problem statement:

To what degree is a South African automotive manufacturing organisation adopting applicable human resource management practices to facilitate the implementation of effective supply chain management?

1.6 AIM OF THE STUDY

This study attempted to examine and comprehend the relationship between human resources management practices and effective supply chain management by means of a conceptual framework and construct developed through a literaturary study, as well as previous studies conducted in this area (refer to **figure 1.1**). The main aim of the study was to determine whether a South African automotive manufacturer implemented identified human resources practices, and further, to what extent these human resource practices enhance supply chain management effectiveness. The study aimed to provide recommendations on the adoption of human resource management practices for the purpose of facilitating the implementation of effective supply chain management.

1.7 RESEARCH OBJECTIVES

1.7.1 PRIMARY OBJECTIVE

The primary objective of this study was to establish to what degree a South African automotive manufacturer implemented effective (previously established) human resource management practices to facilitate the implementation of effective supply chain management.

1.7.2 SECONDARY OBJECTIVES

The secondary objectives were:

- To determine whether *selection practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To determine whether *evaluation practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To determine whether *training practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To determine whether *compensation practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To determine whether *communication practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To determine whether *socialisation practices* in human resources enhance supply chain management effectiveness in the South African automotive manufacturing organisation.
- To identify which human resource (HR) practices *hinder* the implementation of supply chain management effectiveness and efficiency in the South African automotive manufacturing organisation.

- To determine whether differences exist between the categories of the following demographic variables: (*marital status, gender, functional areas employed, management level and education*) with regards to each of the human resource management practices and the supply chain management importance.

In order to ensure the validity of the objectives stated above, a hypothetical statement had to be considered: The application of appropriate human resource management practices will improve the implementation of effective supply chain management in a South African automotive manufacturing organisation.

1.8 IMPORTANCE OF THE STUDY

It was anticipated that the findings of this study would have the following significance:

- To focus attention on the importance of the impact of human resource management practices on supply chain management effectiveness in South Africa.
- To contribute to insights into human resource aspects of supply chain management, which were identified as a weakness in South Africa.

1.9 KEY CONCEPTS IN THIS STUDY

In this part of the study, only a few definitions are provided. A comprehensive literature and a synthesis of definitions are provided in chapter 2. **Table 1.2** provides single definitions of the main concepts of this study.

1.9.1 DEFINITION OF TERMS AND CONCEPTS

Table 1.2: Definitions of terms and concepts

Terms/concepts	Definition
Supply chain management	Supply chain management is the term used to describe the management of flow of materials, information, and funds across the entire supplier chain, from suppliers to component producers, to final assemblers to distribution (warehouses and retailers), and ultimately to the consumer (Chandrasekaran, 2010: 4).
Human resource management	Human resource management is a comprehensive and coherent approach to the employment and development of people. Human resource management can be regarded as a philosophy about how people should be managed, which is underpinned by a number of theories relating to a power of behaviour of people and organisations. It is concerned with the contribution it can make to improving organisational effectiveness through people, but it is, or should be, equally concerned with the ethical dimensions: how people should be treated in accordance with a set of moral values. Human resource management involves the application of practices and policies in the field of organisation design and development, employee resourcing, learning and development, performance and reward and the provision of services that enhance the well-being of employees (Armstrong, 2014: 1).
Human resource management practices	Human resource management practices refer to organisational activities directed at managing the pool of employed human resources towards the fulfilment of organisational goals (Tiwari & Saxena, 2012: 669).

1.9.2 CONCEPTUAL MODEL OF THE STUDY

Findings of previous studies (refer to **table 1.1**) about the role of human resource management in supply chain management effectiveness, revealed a significant interdependence between human resource management practices and effective supply chain management. Results also demonstrated the crucial, and vital, role that human resource practices play in the implementation of effective supply chain management. The two main constructs of this study were: effective supply chain management as a dependent variable, and human resource management practices as an independent variable. The human resource practices usually considered in the literature on people management in supply chain management are: (i) staffing, (ii) job design, (iii) performance appraisal, (iv) reward and compensation, (v) training, (vi) socialization and (vii) communication (Shub & Stonebraker, 2009:34; Koulikoff-Souvion & Harrison, 2010: 922). Some of these HRM practices formed the bases for the research instrument originally developed by Chew (2004: 242-248) and later adapted by Khan, *et al.*, (2013). These research instruments (of Chew and Khan) form the bases of a conceptual framework to direct this study, which was eventually adapted and further developed as the research instrument (questionnaire) for this study. Therefore, a six-dimension conceptual model was developed and applied in this study: selection, evaluation, training, compensation, communication and socialisation (refer to **figure 1.1**). As previously mentioned, the model was used to direct the study to investigate to what extent human resource management practices are implemented to enhance effective supply chain management in a South African manufacturing organisation.

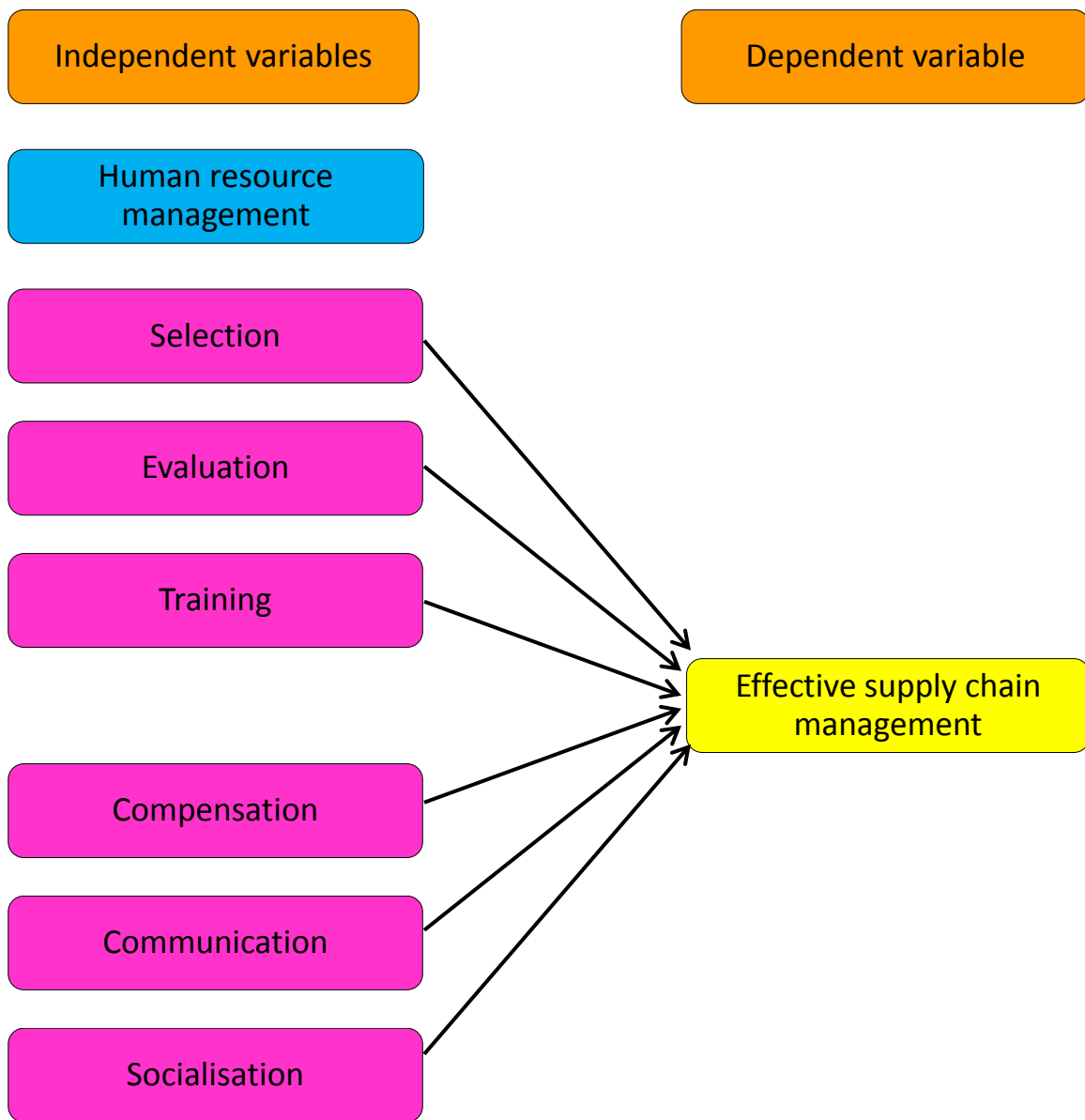


Figure 1.1: Conceptual model of the relationship between human resource management practices and effective supply chain management

Source: Adapted from Koulikoff-Souvion & Harrison, 2007.

1.10 RESEARCH METHODOLOGY

The research methodology presents the philosophical framework with which a research project is developed. It shows how the research is conducted (Wu & Patel, 2015: 97). According to Mitra and Borza (2015: 38), choosing appropriate research methodologies and methods to

pursue a documented research activity, require not only complex documentation, but also impose to find the instruments and methods that can better present and measure the studied phenomenon. Thus, the aim of the research methodology is to provide the framework for ensuring planning and operational activities that follow up the implementation process of scientific procedures.

The research process that was followed in this study is depicted in the diagram below:

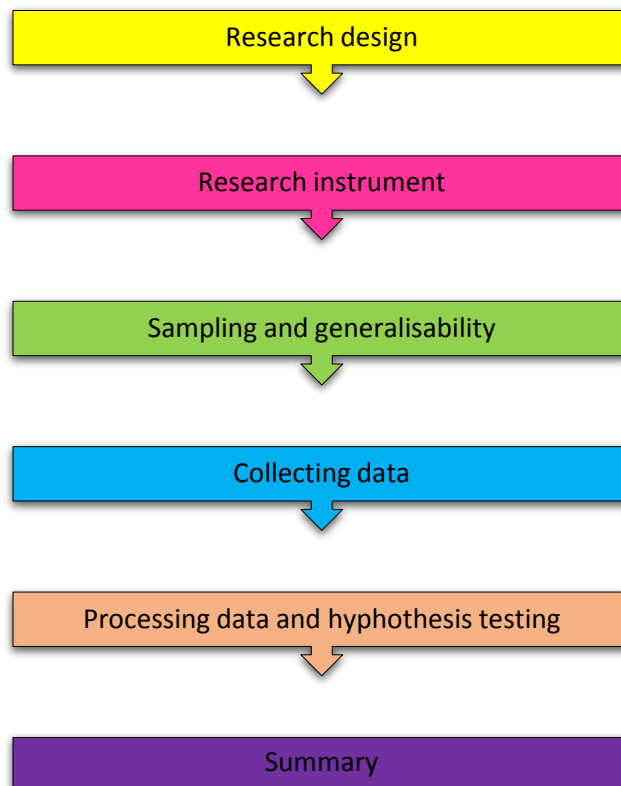


Figure 1.2: Research process

Source: Kumar 2013

1.10.1 RESEARCH DESIGN

Initially the researcher planned to include multiple manufacturing organisations in South Africa in the study. However, the difficulty of finding a comprehensive and up-to-date list of manufacturers, the expected low rate of response to this kind of survey, as well as the scope of the study, necessitated the researcher to search for one large manufacturing organisation which

was willing to participate in the study. Conducting research in an automotive organisation is particularly desired in this study since the automotive industry is well known for applying supply chain management to the fullest extent (Ambe & Badenhorst-Weiss, 2011a: 350). Accordingly, a case study approach was followed. It is crucial to point out that the findings of this study succeed in making contribution to the body of knowledge with regard to the important role that effective human resource management plays to improve supply chain performance in the South African automotive industry.

This study aimed to determine the application of effective human resource management practices in supply chain management in a South African automotive manufacturing organisation, by means of a research instrument (questionnaire), developed through inputs from the literature study and more specifically, studies by Khan, *et al.*, (2013) and Chew (2004: 242-248). Therefore, a quantitative research design was followed.

According to Yilmaz (2013: 311), quantitative research can be defined as research that explains phenomena according to numerical data which is analysed by means of mathematically based methods, especially statistics. In addition to that, the researcher stated that quantitative methods and procedures allow the researchers to obtain a broad and generalizable set of findings and present them concisely. The major advantage of this method is that it allows one to measure the responses of a number of participants to a limited set of questions, thereby facilitating comparison and statistical aggregation of the data (Yilmaz, 2013: 313). Questionnaires are one of the most widely used means of collecting data in quantitative research. Many novice researchers in business and management, and other areas of the social sciences, therefore associate researchers with questionnaires (Rowley, 2014: 309). Quantitative research attempts to establish statistically significant relationships, address questions by measuring and describing same, is based on objective measurement and observation, and is concerned with correlation and causation (Hamer & Collinson, 2014). Quantitative instruments may include tests, interviews, questionnaires and observations (Marwat, 2010). Qualitative research could not be applied to this particular study because qualitative designs are not useful for testing hypotheses.

1.10.1.1 How to achieve the objective of this study

Choosing appropriate data collection methods is important for producing useful data to address issues under investigation. As indicated above, quantitative research uses questionnaire survey and systematic measurements involving numbers (Yilmaz, 2013: 315). The proposed hypothesis in this study determined the degree to which the South African automotive manufacturing company adopting human resource management practices to facilitate the implementation of effective and efficient supply chain management by means of a questionnaire-based survey method. A cross-sectional survey was carried out to collect data from a South African automotive manufacturing organisation.

Therefore, based on the conceptual framework, the study proposes the following hypothesis:

- H.1** Human resources *selection* practices have a positive effect on supply chain management effectiveness in the South African automotive industry.
- H.2** Human resources *evaluation* practices have a positive effect on supply chain management effectiveness in the South African automotive industry.
- H.3** Human resources *training* and development practices have a positive effect on supply chain management effectiveness in the South African automotive industry.
- H.4** Human resources *compensation* practices have a positive effect on supply chain management effectiveness in the South African automotive industry.
- H.5** Human resources *communication* practices have a positive effect on supply chain management effectiveness in the South African automotive industry.
- H.6** Human resources *socialisation* practices have a positive effect on supply chain management effectiveness in the South African automotive industry.

H.7 Six determinants of human management of management practices have significant positive effects on supply chain management effectiveness in the South African automotive industry.

In this study, it is hypothesised that human resource management practices have significant positive effects on supply chain management effectiveness.

1.10.1.2 Variables for quantitative approach

The variables include the dependent variable (the variable which is hypothesised to depend on, or be caused by, another variable) and independent variables (the variables that are believed to be the cause or the influence) (Polit & Beck, 2010: 65). Therefore, the two major constructs of this study are: Effective supply chain management as dependent variable, and human resource management practices including: selection, evaluation, training, compensation, communication and socialisation as independent variables.

1.10.2 RESEARCH INSTRUMENT

1.10.2.1 Questionnaire

The human resource management items in the questionnaire were developed from the literature, and particularly, the instruments developed by Khan, *et al.*, (2013: 179) and Chew (2004: 242-248). Thus, there was a degree of overlapping between the questionnaire of this study, and those of Chew and Khan. The questionnaire comprised three parts. The first part consisted of human resource management practices. *Selection* was composed of three items, *evaluation* of three items, *training* of two items, and *compensation* of two items. The questionnaire also included *communication*, which comprised of three items and lastly, *socialisation*, which comprised four items. The respondents were given different statements and asked to indicate their degree of agreement using a five point Likert type response format, ranging from 1= “Strongly disagree” to 5= “Strongly agree”. The second part of the questionnaire consisted of practices regarding the organisation’s supply chain management efforts. This construct constituted of five items

which were used to measure the supply chain management effectiveness. The respondents were also given different statements and asked to indicate the degree of importance attached to the issues/concerns regarding the organisation's supply chain management efforts, using a five point Likert type response format, ranging from 1= "Not important at all" to 5= "Extremely important".

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

Of no importance	Of minor importance	Of moderate importance	Of large/high importance	Of extreme importance
1	2	3	4	5

The third part consisted of the demographic profile of the respondents.

1.10.2.2 Reliability and validity

A pilot test was undertaken. Pilot testing is essential to check questionnaire items and language used in the items (Ullah & Yasmin, 2013: 12). It is conducted on a small number of participants to assess the adequacy and feasibility of the intended research (Leon, Davis & Kraemer, 2011: 629). By doing so, the pilot study can identify problems and strengthen the quantitative research. Conclusion validity was used to examine the constructs in the study. Conclusion validity

indicates whether there is a relationship between the independent variable and the dependent variable or outcome (Yilmaz, 2013: 319).

1.11 CENSUS

The organisation selected for this case study was a South African automotive manufacturer. The target respondents for this study were people with knowledge in terms of applicable qualification and/or experience, which included staff, supervisors and managers in supply chain management in the selected organisation. The population included 110 potential respondents, among others, supply chain managers, line managers in supply chain functions, operation level purchasing staff, transportation/logistics staff, distribution staff, inventory/warehousing staff, quality controller, production staff and schedulers. A census survey was used to collect data.

The researcher firstly obtained written consent from top management in the organisation to conduct the research in the organisation. Thereafter, the researcher sought to get targeted respondents' e-mail addresses. Lastly, a consent form with a full explanation of the study's intent was sent via email to all targeted selected personnel, in different areas and levels, in order to indicate their willingness to participate in the study.

1.12 COLLECTING DATA

The questionnaire was forwarded via email, along with an introduction letter explaining the study's intent to the targeted employees in the supply chain. Respondents were given ample time (1month) to complete the questionnaire. These were followed up twice in this time period. Data was collected using a monkey survey and some paper-based questionnaires.

1.13 PROCESSING DATA AND HYPOTHESIS

The findings were analysed by means of statistical analysis, and interpretation was an essential part of answering the hypothesis or research questions (Borbasi & Jackson, 2012, p. 269). Proper design of the data analysis procedures increases the rigor and the validity of data interpretation (Wu & Patel, 2015: 98).

1.14 CONCLUSION

Conclusions were based on the findings and were interpreted considering both the literature and empirical phase of the study.

1.15 ETHICAL CONSIDERATIONS

All professions are guided by a code of ethics which evolves over years to accommodate the changing values, needs and expectations of the authorized bodies. Being ethical means adhering to these codes of conduct (Babikir, Habour & Elwahab, 2010: 20).

This study sought to get written permission to conduct research in a particular South African automotive manufacturing organisation. It is important that consent is obtained after full explanation of the study's intent (Allen, Powers, Gronowski & Gronowski, 2010: 1676). The respondents were informed of top management's permission to do the study and they were requested to voluntarily participate in the study. The completed questionnaire was regarded as consent to participate.

This study guaranteed:

- The anonymity, the privacy and the confidentiality of the respondents' identity.
- The anonymity, the privacy and the confidentiality of the collected data:

- The paper-based record will be kept in a secure location and will only be accessible to the researcher, supervisor and examiners involved in the study.
- The mentioned parties will be required to sign statements agreeing to protect the security and confidentiality of identifiable information.
- The anonymity of the South African automotive manufacturer. The participating South African automotive manufacturing organisation will only be addressed as “Automotive manufacturer” throughout the study.

1.16 STRUCTURE OF THE STUDY

Part one focused on the conceptual and theoretical framework of this research study and consisted of two chapters namely: introduction of the study (Chapter one), which presents the dissertation titled: Supply chain management: A human resources perspective, and the literature review (Chapter two). Chapter one deals with an introduction of the study in which a background of the topic is explained, as well as the place where the empirical study was conducted. This is then followed by the background, the research problem, the problem statement, the research objectives and the importance of the study. Chapter two provides an overview of human resource management as well as relevant literature associated with it. Chapter three provides an outline of human resource management elements and necessary literature linked to it which was selected to support the study. Chapter four presents the research methodology of this study which will be used to achieve the research objectives of this study. Chapter five involves the presentation of quantitative findings and analyses. Chapter six presents the summary and the conclusions of this study, as well as recommendations for the the participating automotive manufacturing organisation and for future research on this topic. This study is diagrammatically depicted as follows in **figure 1.3**:

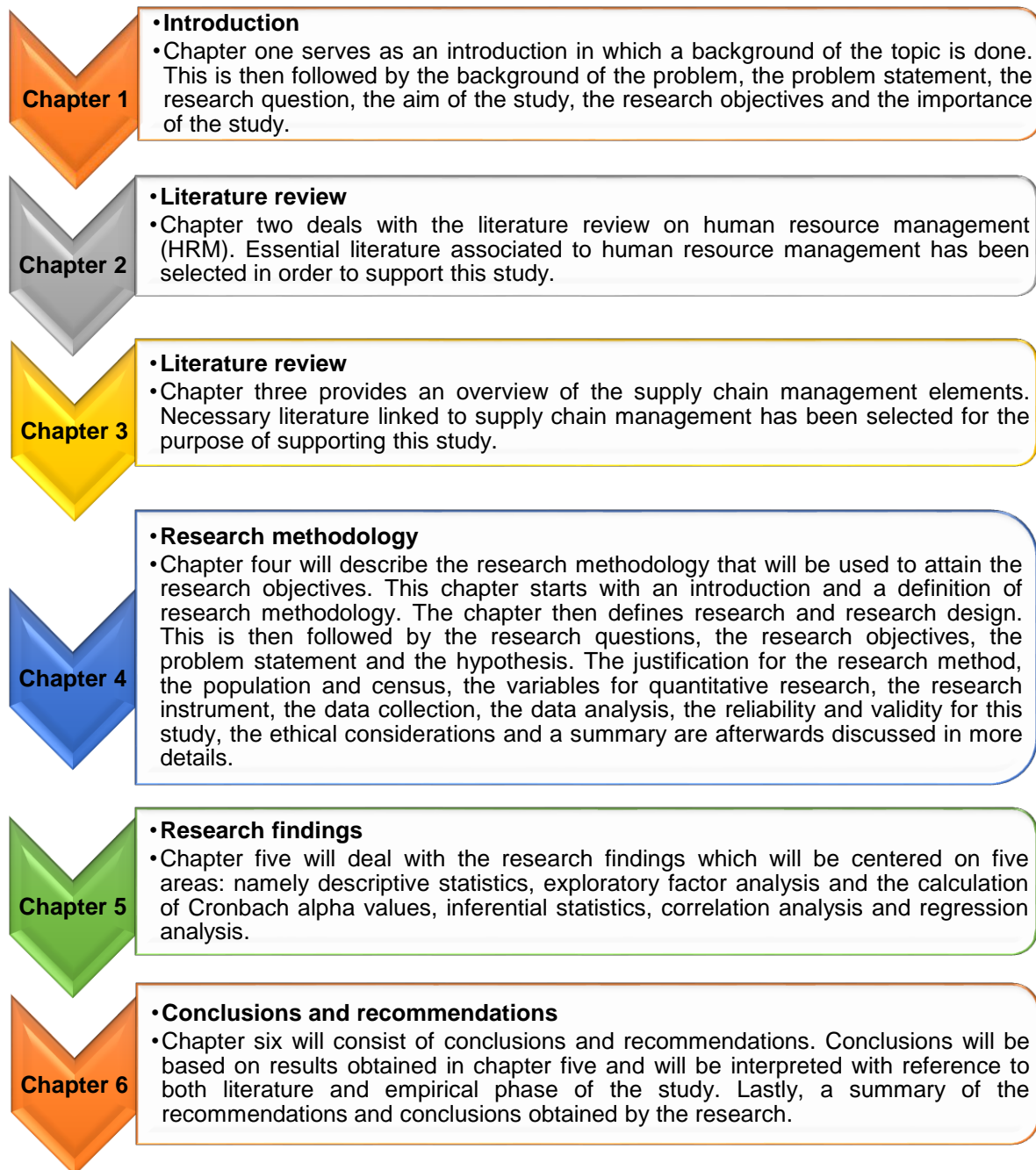


Figure 1.3: Structure of the study

1.17 CONCLUDING REMARKS

This chapter provided an introduction to the research along with an outline of the background of the study. The background to the research problem, the research problem and the aim of the study were delineated along with the research questions and objectives which were the centre of interest of this study. Relevant definitions of terms and concepts were given. For the purpose of achieving the aim of this study, the research methodology was described in a nutshell, which included the research design, the research instrument, the data collection and analysis, as well as the findings and recommendations. The final part of this chapter comprised a discussion on the ethical considerations and a structure of the study that is to follow. The next chapter will provide the literature review on human resource management.

CHAPTER 2

LITERATURE REVIEW: HUMAN RESOURCE MANAGEMENT

2.1 INTRODUCTION TO HUMAN RESOURCE MANAGEMENT

As asserted by Lojić, *et al.* (2012:1), human resource management, as a concise expression of a new philosophy and practice of management, represents the result of accelerated changes in the modern world and the importance attached to people and their potentials. The resources that are available to the organisation can be classified into three categories: physical, organisational, and human (Mujahid, Sameen, Naz, Nazir & Manzoor, 2014: 294; Aslam, Aslam, Ali, Habib & Jabeen, 2013: 127; Zahidul, 2015: 301). As stated by Ciuntu (2012: 1), research has shown that the human aspect of resources within an organisation contributes approximately 80 % of the organisation's value. Accordingly, the author implied that if people are not managed properly, the organisation faces a serious chance of falling apart. Organisations that do not put emphasis on attracting and retaining talents may face dire consequences, since their competitors may be outplaying them in the strategic employment of their human resources (Chan, 2010). Even in manufacturing organisations, the way in which human resources are managed is seen as an increasingly serious element in the production process, primarily in terms of quality and reliability (Mujahid, *et al.*, 2014: 294).

Managing human resources has always remained as an important concern for managers (Aslam, *et al.*, 2013: 126), particularly because managing human resources is much more challenging compared to managing technology or capital (Swathi, 2014: 21; Mufeed & Gulzar, 2015: 287). As a result, the significance of human resource management has increased among other functions of administration (Burma, 2014: 92). At present, human resource management is seen as a main stream department in modern businesses; (Aslam, *et al.*, 2013: 126; Burma, 2014: 92). The question, 'which kind of asset can provide sustainability, competitive advantage, and superior performance?', has been asked and discussed among managers and scholars over the past few decades (Lee, Lee & Wu, 2010: 1391). It became clear that human resources were

regarded as the most valuable intangible asset of an organisation, which makes it possible for organisations to compete in the market, achieve superior performance, realise competitive advantage, and improve organisational performance over a very long time, or possibly forever (Lee, *et al.*, 2010: 1391; Swathi, 2014: 1; Usman & Dugguh, 2014: 2; Shaukat, Ashraf & Ghafoor, 2015: 329; Lojić, *et al.*, 2012: 1;; Zahidul, 2015: 301; Mufeed & Gulzar, 2015: 27).

Therefore, human resource management is lately seen as the major factor which differentiates between successful and unsuccessful organisations, and more important than technology or finance in achieving competitive advantage (Zahidul, 2015: 301; Aslam, *et al.*, 2013: 126). Human resources need to be effectively managed in order to assist in accomplishing organisational goals (Usman & Dugguh, 2014: 2). The effective management of human resources requires effective human resource management systems (Swathi, 2014: 21; Mufeed & Gulzar, 2015: 287). Contemporary human resource management theories also recognise that the human resource, unlike financial or technological ‘resources’, cannot be manipulated or ‘exploited’, and that it requires complex and sensitive management in order to fully realize its potential (Nankervis, Compton, Baird & Coffey, 2011: 15; Shaukat, *et al.*, 2015: 329). Furthermore, the authors specified that HR cannot be substituted by machines of any degree of automation, mobilisation or remote control in the present or future centuries. With the increase in competition, locally or globally, organisations must become more adaptable, resilient, agile, and customer focused to succeed (Indermun, 2014: 126). In conclusion, HR is the most critical factor in every organisation (Mufeed & Gulzar, 2015: 287).

2.2 ORIGINS AND THE EVOLUTION OF HUMAN RESOURCE MANAGEMENT

In order to understand the concept of human resource management entirely, researchers detailed different phases/origins of human resource management (Zahidul, 2015: 301). Various attempts have been made towards tracing the historical development of the discipline of human resource management (Rotich 2015: 58). Managing human resources is a meticulous and complex process (Aslam, *et al.*, 2013: 127; Mujahid, *et al.*, 2014:295). The underlying forces behind the evolution and development of human resource management have been (and still are) mainly

environmental, and the quest for knowledge of better ways of acquiring and utilising labour (Itika, 2011: 1). In addition to that, for more than a century, human resource management as a discipline and practice in the management of people in an organisation, has evolved and developed into different areas. The academic studies of human resource management dates back to the late 19th century, with the first college courses and textbooks appearing just after 1900 (Huselid, 2011: 309).

The history of HR management can be dated back to the 19th century, when some enlightened industrial organisations in the US and Europe employed welfare officers to look after the wellbeing of workers, especially women and children; this period was referred to as ‘the welfare stage’ in the industrial age (Shapiro, Hoque, Kessler, Pepper, Richardson & Walker, 2013: 12; Itika, 2011: 6; Nayab, 2011; Rotich, 2015: 60; Mujahid, *et al.*, 2014: 295). In the 1920s and 1930s, organisations employed labour managers to handle pay, absence, recruitment and dismissal (Shapiro, *et al.*, 2013: 12; Nayab, 2011; Mujahid, *et al.*, 2014: 295; Rotich, 2015: 60). By the late 1940s, labour management and welfare work was integrated under the banner of ‘personnel administration’ (Shapiro, *et al.*, 2013: 12; Itika, 2011: 7; Nayab, 2011; Rotich, 2015: 61; Mujahid, *et al.*, 2014: 295). Human resource management had various names changes throughout history, the name change was mainly due to the change in social and economic activities throughout history (Vinay, 2015). As indicated in **table 2.1**, during the pre-1900s, the name of human resource did not exist yet. The term ‘labour relation’ only emerged in 1900 during the industrial revolution. In 1920, during civil service and World War I (WWI), the term developed into ‘industrial relations’ and in 1940, during the scientific management and World War II (WWII), ‘industrial relations’ changed into ‘personnel administration’ as shown in **table 2.1**. As the importance of people to the success of organisations was increasingly recognised throughout the 1970s and 1980s, personnel administration became ‘personnel management’ and eventually became ‘human resource management’ (Lojić, *et al.*, 2012: 2; Itika, 2011: 8; Nayab, 2011; Mujahid, *et al.*, 2014: 296, Vosburg, 2007). Today some organisations refer simply to the ‘people’ function and call their most senior HR executive the ‘chief people officer’ (Shapiro, *et al.*, 2013: 12). With the changing trends of industry in the competition-oriented environment of open markets, human resource management becomes a significant variable for the efficient growth of any organisation (Aslam, *et al.*, 2013: 127).

As shown in **table 2.1**, in 2010, during the period of global economy and E-enable technologies, the HR name still need to be determined (TBD). Human resource management is constantly changing and improving by abandoning traditional management models, giving way to more modern, more flexible, more practical and more human forms of management which characterise humanisation of the relations of production, expressed through increased motivation, satisfaction and adequate stimulation (Lojić, *et al.*, 2012: 2). While it is difficult to predict the nature of human resource management (HRM) in the future, there are strong indications that its theory and practice will be continually transformed as a consequence of globalisation, new technology and associated fundamental changes in the nature of work and jobs (Rotich, 2015: 64).

Table 2.1: Milestones in the history, evolution and stages of evolution and development of human resource management

Period	Time	Decade	Business realities	HR name change	HR issues
Pre-World War II	2000BC – 1000BC	Pre-1900	Small businesses and guilds	Did not yet exist	HR owned the HR issues
	1700 – 1900	1900	Industrial revolution	Labour relations	People as interchangeable parts
	1920 – 1930	1920	Civil service and WWI	Industrial relations	Workers' right and more formalised processes
Post World War II	1945 – 1960	1940	Scientific management and WWII	Personnel administration	Efficiency experts and more highly evolved HR processes
Social Issues Era	1963 - 1980	1960	Civil rights and compliance	Personnel	Legal compliance and reporting: 'policy police'
Cost–Effectiveness Era	1980-early 1990s	1980	Human relations, the knowledge/ service economy and mergers and acquisitions.	Human resources people	Relevance in the fast-changing world, motivation and 'human relations' theories abound
Technological Advancement Era	1990 – present	2000	Modern organisations	HRM, Human capital, Organisational capability	No new official names, but lots of 'morphing' as the transactional parts get outsourced and the transformational parts get defined (Focus on organisation effectiveness)
		2010	Global economy and E-enable technologies	To be determined (TBD)	

Source: Adapted from Rotich, 2015; Nankervis, *et al.*, 2011; Vosburgh, 2007; Aslam *et al.*, 2014: 130.

2.3 DEFINITIONS AND KEY CONCEPTS OF HUMAN RESOURCE MANAGEMENT

Human resource management philosophy not only emphasises employee efficiency, effectiveness and productivity, but also employees' needs (Khan, *et al.*, 2013: 178).

The concepts of employee efficiency, effectiveness and productivity are defined as follows:

Employee efficiency is a complex measurable parameter which characterises an output produced by efforts and by achievements of an employee. In most cases the employee efficiency answers questions such as (Task management guide, 2011a):

- Is this employee useful to the organisation? (Does he/she produce more value than he/she consumes?);
- How useful is this employee? (What worth does the employee produce exactly?)

Employee effectiveness is a capability of employees to produce a specific, desired effect with minimised costs and in strict compliance with initial requirements. It is a qualitative characteristic which indicates the extent to which targeted problems are addressed and the degree to which pre-set goals and objectives are achieved by employees (Task management guide, 2011b).

Employee productivity, sometimes referred to as workforce productivity, is an assessment of the efficiency of a worker or group of workers (Rousse, 2014).

Clearly the three concepts are closely related, one can say that efficiency and productivity are about *value adding*, and effectiveness about the *achievement of objectives*. However, they all measure the success and contribution of staff or human resources.

The whole world recognises that human resources are vital to achieve success in the most effective and efficient way (Lee, *et al.*, 2010: 1351). Providing a definitive definition of contemporary human resource management is however problematic. This is because there is no generally agreed framework for understanding and analysing the HR function (Farnham, 2010: 4). Human resource management has been defined by different authors from different perspectives. **Table 2.2** displays the definitions as well as the key concepts of human resource management.

Table 2.2: Definitions and key concepts of human resource management

Human resource management definitions			
	Authors	Definitions	Key concepts
	Wiśniewska & Wiśniewski (2012: 1620)	Human resource management is a current approach to the implementation of the personnel function of an organisation. It consists of proper formulation and use of human resources to achieve organisation objectives, taking into account the interests of both employers and employees.	<ul style="list-style-type: none"> • Execution of the organisational personnel function • Application of HR • Attainment of organisational objectives • Consideration of both employers and employees' interests
	Amstrong (2014: 1)	Human resource management is a comprehensive and coherent approach to the employment and development of people. Human resource management can be regarded as a philosophy about how people should be managed, which is underpinned by a number of theories relating to a power of behavior of people and organisations.	<ul style="list-style-type: none"> • Management philosophy • People and organisational behaviour

Decenzo, Robbins & Verhulst (2010: 33)	Human resource management is the part of the organisation concerned with the “people” dimension. Human resource management can be viewed in one of two ways. Firstly, human resource management is a staff or support function in the organisation. Its role is to provide assistance in human resource management matters to line employees, or those directly involved in producing the organisation’s goods and services. Secondly, human resource management is a function of every manager’s job. Whether or not one works in a formal human resource management department.	<ul style="list-style-type: none"> • People dimension • Organisational support function • Provision of help in HRM matters • Effective management of employees
Dessler (2014: 2)	Human resource management is the process of acquiring, training, appraising, and compensating employees, and of attending to their labour relations, health and safety, and fairness concerns.	<ul style="list-style-type: none"> • Procedure of acquiring, training, appraising, and compensating employees • Dealing with labour relations • Addressing employees’ health and safety as well as their fairness concerns
Schmitz (2012:12)	Human resource management is the process of employing people, training them, compensating them, developing policies relating to them, and developing strategies to retain them.	<ul style="list-style-type: none"> • Procedure of acquiring, training, appraising, and compensating employees • Development of policies • Development of plans for the purpose of keeping employees

Mufeed & Gulzar (2015: 288)	Human Resources Management is the process of creating, applying and evaluating guidelines, methods and programs relating to the recruitment, retaining, motivating, and management of people in an organisation.	<ul style="list-style-type: none"> • Procedure of creating, implementing and assessing guidelines, methods and programs
Shaukat, <i>et al.</i> (2015: 329)	Human resource management refers to the policies and practices involved in carrying out the 'human resources' aspects of management positions including human resource planning, job analysis, recruitment, selection, orientation, compensation, performance appraisal, training and development and labour relations	<ul style="list-style-type: none"> • Policies and practices which takes part in performing HR practices
Elarabi & Johari (2014: 113); Swathi (2014: 24)	Human resource management is concerned with the development of both individuals and the organisation in which they operate. HRM, then, is engaged not only in securing and developing the talents of individual workers, but also in implementing programs that enhance communication and cooperation between those individual workers in order to nurture organisational development.	<ul style="list-style-type: none"> • Organisational and individual development • Application of programs which improves communication and cooperation • Nurture organisational development
Vijay, Raj & Kothai (2014: 1)	Human resource management is the process of managing people in an organisation as well as managing the existing interpersonal relationships. It is responsible for the attraction, selection, training, assessment, and rewarding of employees, while also overseeing organisational leadership and culture and ensuring compliance with employment and labour laws. HR	<ul style="list-style-type: none"> • Management of people • Management of the existing interpersonal relationships • Accountable for human resource practices • Organisational leadership and culture • Compliance with employment and labour laws

	now focuses on strategic initiatives like mergers and acquisitions, talent management, succession planning, industrial and labour relations, and diversity and inclusion.	
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Based on the integration of the key ideas of human resource management stated above, the researcher defines the concept of human resource management as follows:

Human resource management can be defined as the management of people . It is concerned with the development of both individuals and the organisation in which they operate. It consists in proper formulation and application of human resources to achieve organisational objectives, taking into account the interests of both employers and employees. It is responsible for recruiting people, selecting them, orienting them, assessing them, training and developing them, providing them compensation for the purpose of attaining organisational objectives, promoting both internal and external communication and providing them with a work environment which encourages socialisation.

2.4 IMPORTANCE OF HUMAN RESOURCE MANAGEMENT

In the introduction of this chapter, the importance of human resources and HRM have been briefly discussed. It is generally accepted that the human side of the business is the most important asset of the business (especially in this global economy), and therefore HRM has become increasingly more important than twenty years ago (Schmitz, 2012: 47; Lee, *et al.*, 2010: 1391). As specified by Burma (2014: 85), since global economies changed from industrial to knowledge economies, global competition is the basic element to define organisations' strategies. Knowledge is seated in human beings. Human resource management has an important role to provide the correct human beings to an organisation (Burma, 2014: 85). HRM is thus responsible for personnel recruiting, orientation and performance appraisals etc.

Human resources management is a subsystem of organisation management that provides capable and responsible staff for every position, and further enables every individual, and the organisation as a whole, to achieve maximum business goals (Lojić, *et al.*, 2012: 2). It plays a vital role in the organisational development and its progress (Mujahid, *et al.*, 2014: 297). HRM plays a significant role in ensuring employee satisfaction, which may result in improved performance and productivity of employees (Aslam, *et al.*, 2013: 131; Mujahid, *et al.*, 2014: 297; Sulieman & Mohammad, 2011: 3). A competent work force pool, and the right person on the right job, is highly desired by organisations (Aslam, *et al.*, 2013: 131). According to Nayab (2011: 89), human resources management aims to increase the contribution of employees in the organisation. These contributions are also known as “human capital” and has certain qualities that make it valuable. Human capital or resources have the following qualities (Noe, Hollenbeck, Gerhart & Wright, 2010: 4):

- Human resources are *valuable* because “high-quality employees provide a needed service as they perform many critical functions in the organisation”.
- Human resources are *rare* in the sense that a person with high levels of the needed skills and knowledge is not common.
- Human resources *cannot be imitated*. To imitate human resources at a high performing competitor, an organisation would have to figure out which employees are providing the advantage and how. Then the organisation would have to recruit people who can do precisely the same thing and set up the systems that enable those people to imitate the competitor.
- Human resources have *no good substitutes*. When people are well trained and highly motivated, they learn and develop their abilities, and care about customers. No other resource can match committed and talented employees.

These qualities imply that human resources have enormous potential. An organisation realises this potential through the ways it practices human resource management (Noe, *et al.*, 2015: 4).

In conclusion, in organisations with effective human resource management, employees and customers tend to be more satisfied, and the organisations tend to be more innovative, have greater productivity, and develop a more favourable reputation in the community (Noe, *et al.*, 2010: 1).

2.5 PRINCIPLES OF HUMAN RESOURCE MANAGEMENT

Human resource management principles and techniques for people management in competitive organisations are drawn from theories found in different disciplines (Itika, 2011: 2). The complexity of the human resources management, and its ability to be creative and a scientific resource, results from its fundamental principles underlying at its foundation (Ciuntu, 2012:4). From these principles, the most relevant and meaningful are mentioned below (Aslam, *et al.*, 2013: 9; Ciuntu, 2012: 4; Farae & Dayma, 2016: 129; Swathi, 2014: 23):

- The principle of previewing, training/forming and providing human resources in relation to the requirements of scientific and technical revolution and the concrete needs of organisations.
- The principle of continuous training of human resources for the purpose of saving financial resources on the one hand, and rapid integration into employment of human resources on the other hand.
- The principle of recruitment, selection and orientation in relation to the needs of ensuring consistency between quantitative and qualitative employment resources and available jobs.
- The principle of personnel assessment, physical energy and mental stress resulting from the assessment of workstations and work performance.

- The principle of motivation of employees, establishment and differentiation of remuneration in relation to the level and the intensity of the work, and the quantitative and qualitative performances, and the promoting and building of professional careers.
- The principle of labour protection facing the risks of illness and accidents, work and the social protection facing social risks that cannot be previewed.
- The principle of maximum economic efficiency of utilisation of all resources in conditions of security and health protection, highlighting the productivity gains on workstations, individuals or work teams.
- The principle of information, communication, personal negotiation, and also representatives (unions, associations, councils, etc.).
- The principle of integration, cooperation and the participation of employees in decision-making, and to the achievement of the organisation's objectives.

2.6 FUNCTIONS OF HUMAN RESOURCE MANAGEMENT

The human resource management function was traditionally considered by managers as a tool to deal with staff function, record keeping and file maintenance for organisations (Lee, *et al.*, 2010: 1392). However, according to the authors, the human resource management function has evolved into being a strategic partner, sharing ideas, perspective, and resources with marketing, finance, and accounting departments. Human resource management is involved in all the functional areas of management such as production management, financial management, and marketing management (Elarabi & Johari, 2014: 14). Further, every manager from top to bottom, working in any department, has to perform human resource or personnel functions or activities. Human resource management functions (also called HR processes) are carried out by the managers to fulfil the goals and objectives of the organisation (Elarabi & Johari, 2014: 14).

Some of the major functions of human resource management can be classified in three categories (Smriti, 2015; Elarabati & Johari, 2014: 14; Swathi, 2014: 22; Farae & Dayma, 2016: 128; Kalpana, 2016; Hossain, 2016):

- **Managerial functions:** The human resource manager is part of the organisational management. So he/she must perform the basic managerial functions of planning, organising, directing and controlling in relation to his/her department.
- **Operative functions:** The operative functions are those tasks or duties which are specifically entrusted to the human resource or personnel department. They are concerned with recruitment, employment, development, compensation, integration and maintenance of personnel of the organisation.
- **Advisory functions:** Advisors in human resources have specialised education and training in different areas of managing human resources. They are experts in a particular area and can give advice in matters relating to specific areas in human resources management of the organisation. In addition, they offer advice to top management and department heads.

2.7 HUMAN RESOURCE MANAGEMENT PRACTICES

2.7.1 INTRODUCTION

Human resource management practices refer to organisational activities directed at managing the group of human resources, and ensuring that the resources are employed towards the fulfilment of organisational goals (Shaukat, *et al.*, 2015: 329). HRM practises are established by an organisation to support administrative personnel functions, performance management, employee relations and resource planning (Mittar & Deep, 2015:1).

The most important factors that affect the operational performance of an organisation is the human resources (Sendogdu, Kocabacak & Guven 2013: 818). Effective human resource

management requires an effective human resource management systems (Shaukat, *et al.*, 2015: 329; Tiwari & Saxena, 2012: 671). A HRM system should be backed up by strong human resource management practices (Shaukat, *et al.*, 2015: 329). In addition to that, and in order to attract, retain and add to shareholder value, innovative human resource management practices are required to be implemented.

The history of human resource management in organisations clearly shows how such practices are connected to the social, political, economic and technological context (Scheible & Bastos, 2012: 62). This highly turbulent modern environment has forced organisations to adopt new workplace practices that enhance sustained levels of high performance (Sarbarpiya & Ishita, 2011: 22). Beh and Loo (2013: 155), indicated that according to the universalistic perspective of human resource management practices, a set of practices can create a competitive advantage and improves a firm's performance. An organisation performs best when all of these practices are managed well (Noe, *et al.*, 2010: 1). In organisations with effective human resource management (HRM), employees and customers tend to be more satisfied, and the organisations tend to be more innovative, have greater productivity, and develop a more favourable reputation in the community. Tanveer, Shaukat, Alvi and Munir (2011: 112), are of the opinion that innovative human resource practices can only be implemented in knowledge organisations.

To gain competitive advantage and become successful in this landscape, organisations must constantly come up with new ways to drive innovation in business processes, management practices and products and services (Indermun, 2014: 126). Innovation is a function of the human mind.

Different HRM practices are not always universally applicable. Some organisations have tried to transfer certain human resource management practices from one country to another. It has been found that some practices can be transferred easily across nations almost without any change, but some must be modified to become workable in other settings, and some are more deeply culture-specific and may not be applicable at all (Tiwari & Saxena, 2012: 675).

It is important that an organisation implements HRM practices that make the best use of its employees (Burma, 2014: 91).

As indicated in section 1.8.2, this study focused on the following HRM practices: selection, evaluation, training, compensation, communication and socialisation. These HRM practices were discussed in the next section.

2.7.2 THE HUMAN RESOURCE MANAGEMENT PRACTICES CONSIDERED IN THIS STUDY

According to Rotich (2015: 58), certain HRM practices are universally practiced in different organisations. These practices are used separately, or may be in a combination, to improve organisational performance. Practices such as compensation, staffing, training and development, performance management, and other human resource management practices, may be regarded as an investment that directly affect employees' motivation and ability to provide products and services that are valued by customers (Noe, *et al.*, 2010: 500). Human resource practices play a critical role in the success of an organisation, and the implementation of the best and most suitable human resource practices ensure that an organisation is prepared for whatever challenges that may lie ahead (Leviticus, 2010). From an employee perspective, strong human resource practices show the organisation's commitment to their success (APEX, 2010). In addition to that, for business owners, consistency and documentation of human resource practices will help ensure that all employees are treated fairly, positively impacting the organisation's productivity and reducing its liabilities.

As indicated earlier, this study has focused on the following basic human resource management (HRM) practices:

2.7.2.2 HRM practice 1: Selection

Selection refers to the process by which the organisation attempts to identify candidates or applicants with the necessary knowledge, skills, abilities, and other characteristics that will help the organisation achieve its goals (Noe, *et al.*, 2010: 7). Further, the authors mentioned that an organisation makes selection decisions in order to add employees to its workforce, as well as to transfer existing employees to new positions. High-performance organisations need selection methods that identify more than technical skills, such as the ability to perform accounting and engineering tasks. The employers may for example use group interviews, open-ended questions, and psychological tests to find employees who innovate, share ideas, and take initiative (Noe, *et al.*, 2010: 500). A range of assessments in the selection process should be utilised to evaluate the work values, personality, interpersonal skills and problem-solving abilities of potential employees to assess their 'service orientation' (Nickson, 2013: 4).

The selection should involve a series of complex decisions concerning the choice of person, choice of methods to use, and the choice of information (Mufeed & Gulzar, 2015: 290; Schmitz, 2012: 143). Selection begins with the candidates identified through recruitment, and attempts to reduce the number to the individuals that are best qualified to perform the available jobs. Having completed the process of shortlisting in order to narrow down the pool of candidates, organisations are now in a position to carry out final selection. The objective of any selection method is to obtain evidence on which to base a decision. The decision is whether the candidate is likely able to do the job (Shapiro, *et al.*, 2013: 36).

The criteria for choosing selection methods varies, but may include the following (Shapiro, *et al.*, 2013: 36):

- The selection criteria for the job to be filled.
- Acceptability and appropriateness of the methods to the candidates.
- Qualifications of the staff involved in the selection.

Organisations utilise approaches such as: gathering, quantifying, and estimating information about the qualifications of individuals for particular positions, for the purpose of enhancing the probability of appointing persons who possess the right expertise and capabilities to the post (Ullah & Yasmin 2013: 9). An effective recruitment and selection process leads to the appointment of the right candidate, which in turn reduces personnel turnover (Johnston, 2012). Interviews and background checks ensure that the organisation employs a candidate who is reliable and carries out the objectives of the organisation, often linked to providing quality goods and services to its customers (Johnston, 2012; Kokemuller, 2013).

2.7.2.3 HRM practice 2: Evaluation

Evaluation or performance appraisals are the basic element of the human resource management. Many HR decisions, such as promotions and merit increases (Obisi, 2011: 94), are completely based on the information provided by the appraisal (Tanveer, *et al.*, 2011: 114). Performance appraisal generally involves human resource activities of various evaluation designs, both formal and informal, and different evaluation periodicities, each of which proportions a mix of transaction-based or relationship-based strategies (Shub & Stonebraker, 2009: 34). The purpose of performance appraisal is to improve goal setting and feedback processes to enable employees to direct, correct and improve their performance. It can be based on results or behaviour (Lee, *et al.*, 2010: 1394; Shaout & Yousif, 2014: 966; Al-Qudah & Al-Momani, 2011: 253). The importance of performance appraisal can be summarised as: (i) it is necessary in order to allocate resources in a dynamic environment; (ii) reward employees; (iii) give employees feedback about their work; (iv) maintain fair relationships within groups; (v) develop employees; (vi) comply with equal opportunity regulations (Adaeze, 2014: 164). Evaluation is an invaluable tool for human resource management officers to continuously evaluate and audit the performance of employees in order to help organisations gain a competitive advantage (Obisi, 2011: 92; Lee, *et al.*, 2010: 1394). Performance appraisals are the basic element of human resource management. Many HR decisions are completely based on the results of the appraisals (Tanveer, *et al.*, 2011: 114). However, selecting suitable measurement instruments and items are critical for successful appraisals (Dessler, 2012: 158). Appraising performance also assumes that the performance

standards (goals) have been set, and that the employee gets feedback to eliminate performance deficiencies (Dessler, 2012: 158). The continuous process of identifying and measuring performance assists in developing the performance of individuals and teams by aligning their performance with the organisation's goals. Therefore, a worker's development is a continuous series of defining performance objectives, presenting training essentials to accomplish the objectives, appraising performances as to the achievement of the objectives, and then setting new and higher objectives (Ullah & Yasmin, 2013: 5). Organisational performance, and its resultant efficiency and effectiveness, can only be achieved when individuals are continuously appraised and evaluated. The inability of an organisation to install an effective performance appraisal strategy will hinder them from achieving a competitive advantage (Obisi, 2011: 92). Performance appraisal is considered as a significant and indispensable tool for an organisation, for the information it provides is highly useful in making decisions regarding various personnel aspects, such as promotions and merit increases (Obisi, 2011: 94). A performance appraisal should not be viewed as an end in itself, but rather as an important process within a broader performance management system that links the following (Muhammed, 2013: 66):

- Organisational objectives
- Day to day performance
- Professional development
- Rewards and incentives

Performance measures also link information gathering and decision-making processes, which provide a basis for judging the effectiveness of human resource management (HRM) subdivisions, such as recruiting, selection, training and compensation (Obisi, 2011: 94). Employees need to be assessed by the organisation and the outcome should be used to either retain the employees, or improve their performance (Usman & Dugguh, 2014: 7; Adaeze, 2014: 163; Mufeed & Gulzar, 2015: 291). Assessment should not be confined to past performance alone. The potential of the employee for future performance must also be assessed (Muhammed, 2013: 66).

2.7.2.4 HRM practice 3: Training

According to HR Wale (2012), training refers to the methods employers use to give new, or current, employees the skills they need to perform their jobs. The best training departments measure their own performance in terms of how much impact they have on the organisation's performance (Thakore, 2013: 84). Training refers to bridging the gap between the current performance, and the standard desired performance (Elnaga & Imran, 2013: 139). In addition to that, without training, employees don't have a firm grasp of their responsibilities and duties. Effective training programs equip employees with the desired knowledge, skills and abilities to achieve organisational goals. Training programs not only develop employees, but also helps an organisation to take advantage of their human resources in favour of gaining a competitive advantage (Elnaga & Imran, 2013:139). Employee development takes place through proper training and development programs.

Training is an imperative tool for the organisation to revamp the performance of all personnel for organisational growth and success. It is beneficial to both employers and employees since an employee will become more efficient and productive if he/she is trained well (Elnaga & Imran, 2013: 140). Training is a planned effort to enable employees to learn job-related knowledge, skills, and behaviour (Noe, *et al.*, 2010: 7). However, training is not only aimed at improving the employee's knowledge and skills with regard to his or her functional and administrative duties, but the acquisition of certain virtues and attitudes like diligence, willingness, integrity, loyalty and responsibility are also within its scope (Dabale & Jagero, 2014: 64).

Other examples of attitudes that can be acquired by training is health and safety at work (Thakore, 2013: 84), as well as recognising the employer's interests (Aslam, *et al.*, 2013:13). In addition, technological advancements have moulded the need of capabilities and competencies required to perform particular tasks (Elnaga & Imran, 2013: 138). Thus, the authors suggested more improved and effective training programs. Organisations can provide extensive formal training, or rely on acquiring skills through selection and socialisation (Lee, *et al.*, 2010: 1393). Extensive training and development also forms part of a learning organisation, and when

organisations delegate many decisions to work teams, the members of those teams will likely benefit from participating in team development activities that prepare them for their roles as team members (Noe, *et al.*, 2010: 501). Organisations invest in building new skills in their workforce, enabling them to cope with the uncertain conditions that they may face in future, and thus, improving the employee performance through superior level of motivation and commitment (Elnaga & Imran, 2013: 137). Training is therefore a key component in employee motivation. Employees who feel they are developing their skills tend to be happier in their jobs, which results in increased employee retention (Aslam, *et al.*, 2013: 13). The success, or the failure, of an organisation depends on the quality of its human resources, with training being an integral part of the strategy to integrate human resources management with organisations' business strategy (Dabale, Jagero & Nyauchi, 2014: 64).

2.7.2.5 HRM practices: Compensation

Compensation is another of the central pillars of human resources management (Idemobi, Onyeizugbe & Akpunonu, 2011: 110). Compensation refers to all payments, or commodities, (used instead of monetary compensation) to reward the work-force (Mufeed & Gulzar, 2015: 292; Schmitz, 2012: 14). Compensation is important for the performance of the employees (Hameed & Ramzan, 2014: 302). Compensation processes are based on compensation philosophies and strategies, and are reflected in policies and strategies, guiding principles, structures and procedures, which are devised and managed to provide and maintain appropriate types and levels of pay, benefits and other forms of compensation (Bob, 2011). According to Newell (2012: 5), industry trends clearly indicate that pay-for-performance is drawing a renewed focus from executives. In addition to that, pay-for-performance programs offer employees cash incentives based on performance reviews, as well as on how well the organisation is meeting its set goals. According to Schmitz (2012: 14), human resources managers need to make sure the compensation is comparable to what other people for similar jobs are being paid. This involves setting up compensation systems that take into consideration the employee's number of years with the organisation, years of experience, education, and similar aspects. As claimed by Presutti (2011: 8), when incentives are linked to the performance measures, it reinforces an employee's understanding that their contribution is important to the

organisation's success. It is therefore critical that organisations align their compensation practices with performance to enhance the achievement of organisational goals, as well as enhancing their competitive advantage (Idemobi, *et al.*, 2011: 111).

2.7.2.6 HRM practices: Communication

Communication can be defined as the exchange of information, thought and emotion between individuals or groups. Communication plays a fundamental role in balancing individual and organisational objectives (Agarwal & Garg, 2012: 40; Sulieman & Mohammad, 2011: 29; Chukwaku, 2015: 65) and is critical to effective management (Banihashemi, 2011: 15). Communication is the life wire and engine room of every organisation because it ensures the sustainability, and link, by which management clearly expresses the mission, philosophy and goals of the organisation to its staff (Chukwaku, 2015: 63). Sapho (2013: 103) indicated that communication is necessary for conducting business in an efficient manner. Further, the author asserted that any business involves two types of communication: external communication, that is directed to the actors in the business environment, and internal communication, or organisational communication, that is directed to employees.

Communication practices within an organisation are expected to have an important influence on the degree to which employees trust their managers and the organisation's top echelon, as well as their commitment to the organisation (Husain, 2013: 46). Managers who do not have the requisite skills and abilities to communicate effectively, will find it very difficult to strategically harness, develop and utilise the skills of the workers in actualising organisational goals with lowest possible cost and highest possible efficiency (Chukwaku, 2015: 64). Suffice to say that without effective communication, managers cannot ensure the proper planning, organising, directing, supervising, controlling and appraisal of resources (human and material), in the organisation.

Good interpersonal communication amongst workers creates a sense of belonging (Chukwaku, 2015: 68). It is an established fact that clear, concise and honest communication is an important tool for enhancing employee engagement. Poor and ambiguous communication, in nature, can

lead to the dissatisfaction of employees, distrust and employee turnover (Shafi, Saeed, Zaigham, Jahangir, Ahmed, & Ullah, 2013: 22). Sincere and effective communication styles among organisation members, enable members to integrate the organisation through internalisation of the organisation's objectives and rules by the employees (Husain, 2013: 47). Effective communication serves as a core area of human resource management (Chukwaku, 2015: 64).

2.7.2.7 HRM practices: Socialisation

Socialisation as HRM practice, is the process in which managers and employees interact at their workplace (Swart, *et al.*, 2012:17). Socialisation presents a more subjective form of knowledge capture through means of social communication, experience sharing and guidance or apprenticeship (Ng, Goh, Eze, 2011: 4). Socialisation aims to, through communication, change an individual's behaviour into socially accepted organisational behaviour, including common organisational norms, values, tradition (Chimoriya, 2016), organisational culture, policies, responsibilities, expected behaviour and to facilitate learning (Chukwaku, 2015: 69). Socialisation enables workers to construct communication to liberally trade personal or specialised knowledge (Ng, *et al.*, 2011: 5). Socialisation provides employees with the skills and customs necessary for participating within the corporate culture and increases motivation (Gaston, 2010). In addition to that, the authors asserted that generally, socialisation shapes the way employees view teamwork, work habits and the sharing of information, which are all important factors for an organisation.

According to Khare (2013), the benefits of socialising with co-workers are as follows:

- Getting to know the people you work with makes the job enjoyable.
- It stimulates a healthy work culture and cultivates trust within the group. People enjoy working with those who are familiar or comfortable to work with. The productivity and performance level increases in a friendly workplace.

- It generates better networking opportunities for employees, and accelerates the understanding of work dynamics within different divisions of the organisation.

The majority of specialists agree that unsuccessful socialisation results in job dissatisfaction, truancy and a negative socio-psychological climate which reduces work efficiency in an organisation. On the contrary, successful socialisation brings mutual benefits (Grazulis, 2011: 34).

2.8 CONCLUDING REMARKS

In this chapter, human resources and HRM practices were explored. The chapter started with an introduction to HRM, followed by the origins and the evolution of HRM. The definitions and key ideas of HRM were provided, followed by the importance, principles and functions of HRM. The chapter ended with the six most important HRM practices: selection, evaluation, training, compensation, communication and socialisation. These six HRM practices form an integral part of the reserch tool (questionnaire) that was developed for the empirical study.

This study will investigate the HRM practices in the supply chain of an automotive manufacturer in South Africa. As mentioned in section 1.2, the most critical human resource (HR) issues faced by South African automotive supply chain is a shortage of appropriate, skilled and trained personnel.

The following chapter will focus on supply chain management.

CHAPTER 3

LITERATURE REVIEW: SUPPLY CHAIN MANAGEMENT

3.1 INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

From section 1.8, it can be deduced that supply chain management is a management approach or philosophy, based on integrated management of processes across organisations in a supply chain. The various definitions and viewpoints in literature will be discussed further in section 3.3 below.

This chapter begins by providing an introduction to supply chain management. The evolution, definitions, key ideas, objectives, importance and benefits, as well as the hierarchy of supply chain management are then discussed. This is followed by the required competencies of supply chain personnel, followed by the advantages of integrating human resource management planning with supply chain management strategy, and then followed by a conceptual model.

The term “supply chain management” has become a popular buzzword (Basak, Seddiqe, Islam & Akanda, 2015: 22). Supply chain management as an idea is not new, it first emerged in an early form less than 30 years ago, but was quickly picked up by academics, consultants, and practitioners, and amended and re-shaped to reflect the insights gained through the experience of implementation (Christopher & Holweg, 2011: 63). Since then, supply chain management has quite literally transformed our thinking about how markets may best be served, and how a significant competitive advantage can be gained, and lost, if it is neglected. Supply chain management has allowed organisations to rethink their entire operation, and restructure it so that they can focus on its core competencies and outsource processes that are not within the core competencies of the organisation (Admin, 2016). As asserted by Gemma (2014), supply chain management is a critical aspect of civilisation. In addition to that, the author implied that good supply chain management allows organisations to grow internationally for those who are trying to make a global impact for good.

Supply chains need constant maintenance and comprehensive care (Gemma, 2014). In order for a supply chain management approach to be successful, it is vital that staff (human resources) understand the philosophy and principles behind supply chain management. In addition, they must understand the collaboration and coordination between organisation workforces (Ou, Liu, Hung, & Yen, 2010: 530). To improve the overall performance of a supply chain, the members of supply chain must behave as a part of a unified system and coordinate with each other (Arshinder, Kanda & Deshmukh, 2011: 40). According to Menon (2012: 769), the dominant organisation in the chain starts actively managing the chain and the relationships. The success of supply chain management depends on the actions of individuals within the organisations that form part of the supply chain (Cedeño, Farrero & Tarrés, 2014: 134; Holman, Lamare, Grimshaw, Holdsworth & Marchington, 2012: 58). High-calibre human capital can provide organisations with the flexibility they need by being highly adaptive to changes in the environment, both internal and external (Jin, Hopkins & Wittmer, 2010: 943). Some authors proposed that human resource management plays a key role as a support and as a mechanism for operationalising responsibilities and relationships within the supply chain (Lengnick-Hall, Lengnick-Hall & Rigsbee 2013). As stated by People That Deliver (2014: 1), human resources are a key performance driver within supply chains. Furthermore, a systematic approach to HR, with a defined 'people strategy' as part of a broader supply chain strategy, can lead to improved supply chain performance. Human resource management and supply chain management combine suppliers, information systems, finance, employees, manufacturing and operations, sales and marketing, research and development, inventory management and customer relations, and integrate them into a single unified model to create a value chain system (Mittar & Deep, 2015: 3). Acquiring and developing the right supply chain management talent, is the first step of supply chain transformational strategy implementation (Dittmann, 2012; Slone, *et al.*, 2010). Successful supply chain management depends upon employees with a broad skill-set, HR development through training and retraining, teamwork, continuous improvement, high trust among employees and suppliers, and the use of Internet technology in the management of the supply chain (Mittar & Deep, 2015: 3).

3.2 THE EVOLUTION OF SUPPLY CHAIN MANAGEMENT

In order to comprehend the concept of supply chain management, it is crucial to apprehend its historical evolution.

In section 3.2 above, it was indicated by Christopher and Holweg (2011: 63) that the concept of SCM originated 30 years ago. In line with this timeline, Kolenko (2014) indicated that SCM appeared for the first time in the early 1980s in an article of the Financial Times. It is Oliver and Weber, two consultants in the field of logistics, who introduced the concept of supply chain management in literature at the beginning of the 1980s (Felea & Albăstroi, 2013: 74). However, the early publication of supply chain management in the 1980s were mainly focused on purchasing activities and cost reduction related activities (Lu, 2011: 8). Then, the major development, and the significant increases, of publications in the areas of supplier chain integration and supplier-buyer relationship, came in the 1990s when the concept was gradually established. The history of supply chain management has shown that it evolved from an initial focus on improving relatively simple, but very labor-intensive, processes to the present day engineering and managing of extraordinarily complex global networks (Robinson, 2015: 1). The evolution of supply chain management within a changed environment, and business thinking and practices, during the previous century (1900s) may be depicted as a timeline shown in **figure 3.1**

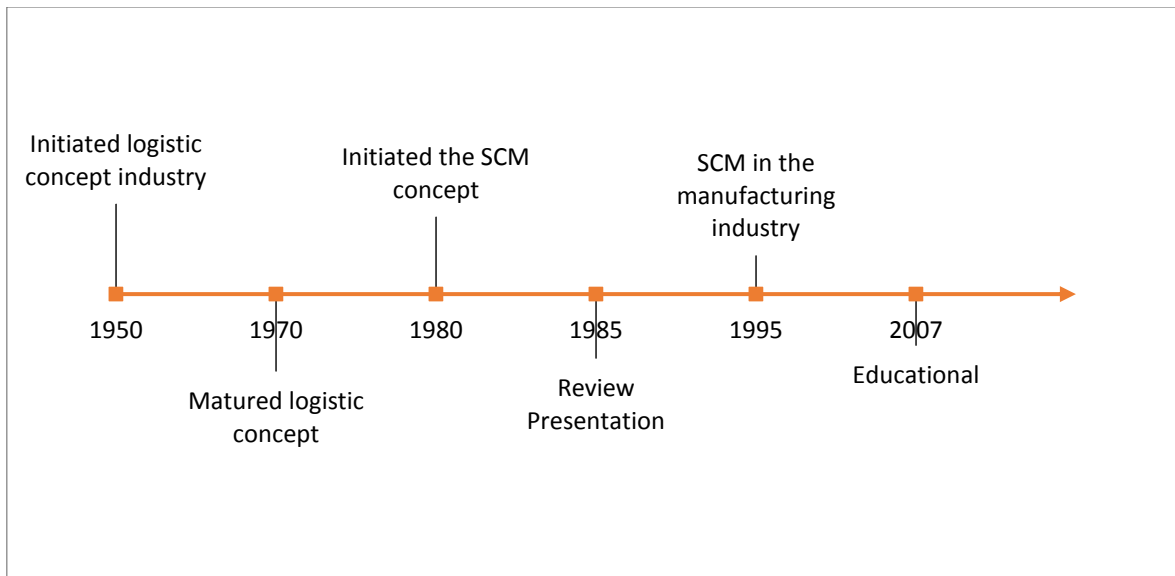


Figure 3.1: Evolutionary timeline of supply chain management

Source: Adapted from Habib and Jungthirapanich, 2008.

The early years

In the 1950s and 1960s, most manufacturers emphasised mass production to minimize unit production costs as their primary operations strategy, with little product or process flexibility (Rajendra, Dixit & Ashish, 2011: 2060). According to Robinson (2015), in the mid-1950s, this concept was extended to transportation management with the development of intermodal containers together with ships, trains, and trucks to handle these containers: this was a forerunner for the supply chain globalisation that was to come much later. Although the terms "warehousing" and "materials handling" were used to describe many of these efforts, this work could be viewed as fundamental applications of industrial engineering, rather than as a discipline of its own (Robinson, 2015; Supply Chain and Logistics Institute, 2015). By the 1960s, a clear trend had developed in shifting more time-dependent freight transportation to truck, rather than rail. This led to the need for joint consideration of warehousing, material handling, and freight transportation, which emerged under the label of "Physical Distribution" (Supply Chain & Logistics Institute, 2015; Robinson, 2015). In the 1970s, material requirements planning (MRP) was developed, and managers realised the impact of huge work-in-process (WIP) inventories

on manufacturing cost, quality, product development, and delivery lead-time (Rajendra, *et al.*, 2011: 2060).

The logistics come of age

The intense global competition of the 1980s, forced world-class organisations to offer low-cost, high-quality, and reliable products with greater design flexibility. Manufacturers utilised Just-In-Time (JIT) and other management instruments to improve manufacturing efficiency and cycle time (Rajendra, *et al.*, 2011: 2060). According to Robinson (2015), the 1980s marked the beginning of a sea-change in logistics. The emergence of personal computers in the early 1980s provided greater computer access to planners, and a new graphical environment for planning. Organisation executives became aware of logistics as an area where they had the opportunity to significantly improve the bottom line if they were willing to invest in trained professionals and new technology (Robinson, 2015). As depicted by figure 3.1, from the 1970s to 1980s, the term logistics evolve into supply chain management. It is in the early 1980s, during the creation era, that the concept of supply chain management was first coined by an American industry consultant.

The technology revolution

The evolution of supply chain management continued into the 1990s. Organisations further extended best practices in managing corporate resources to include strategic suppliers and the logistics function (Rajendra, *et al.*, 2011: 2060). During the integration era, as indicated in table 3.4, the logistics boom was fuelled further in the 1990s by the emergence of enterprise resource planning (ERP) systems (Robinson, 2015). In addition to that, the author stated that these systems were motivated, in part, by the successes achieved by material requirements planning systems developed in the 1970s and 1980s. This motivation was partly driven by the desire to integrate the multiple data bases that existed in almost all organisations, and partly due to concerns that the existing systems might have catastrophic failures as a result of being incapable to handle the year 2000 date. As shown in figure 3.1, in 1985 supply chain management was integrated in the manufacturing industry. Then, in the 1990s, the term supply chain management

was initiated in the service industry. In the 1990s, during the specialisation era in phase one, industries began to focus on “core competencies” and adopted a specialisation model. Furthermore, organisations abandoned vertical integration, sold off non-core operations, and outsourced those functions to other organisations. During the specialisation era, in phase two, specialisation within the supply chain began in the 1980s and matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance management.

3.3 DEFINITIONS AND KEY CONCEPTS IN SUPPLY CHAIN MANAGEMENT

The concept of supply chain management has gained significant attention from practitioners and academics since about 2000 (Swart, *et al.*, 2012: 10). As stated by Hugos (2011: 2), the practice of supply chain is guided by some underlying concepts which have not changed much over the centuries. Applicability of supply chain management has been widely researched, in numerous application domains, during the last decade, and a number of definitions of supply chain management have been proposed in the literature (Felea & Albăstroiu, 2013: 75). Supply chain management has been defined by different authors from different perspectives. **Table 3.1** contains the definitions and key concepts of supply chain management:

Table 3.1: Definitions and key concepts of supply chain management

Supply chain management definitions			
	Authors	Definitions of supply chain management	Key concepts
	Hugos (2011: 4)	The coordination of production inventory, location, and transportation among the participants in supply chain to achieve the mix of responsiveness and efficiency for the market being served.	<ul style="list-style-type: none"> • Coordination among the participants in supply chain • Attainment of mix responsiveness and efficiency for the market being served

The Council of Supply Chain Management Professionals (CSCMP), 2017	SCM encompasses the planning and management of all activities involved in sourcing and procurement conversion, as well as all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third parties, service providers, and customers. In essence, a supply chain management chain integrates supply and demand management within and across organisation.	<ul style="list-style-type: none"> • Planning and management of all activities • Coordination and collaboration with channel partners • Integration of supply and demand management within and across an organisation
Mittar & Deep (2015: 2)	SCM is a set of synchronised activities. With its implementation of SCM, it is recognised that coordination among partners within the supply chain is a key factor to success. In order to operate a supply chain efficiently in a cooperative manner, all related functions across the supply chain must operate in an integrated manner.	<ul style="list-style-type: none"> • Set of coordinated activities • Coordination among SC partners • Operate the whole the supply chain in an integrated manner
APICS dictionary, 2008	SCM is the global network used to manage activities of delivering products and services, from raw materials all the way through to end customer, using an engineered flow of information, physical distribution, and cash.	<ul style="list-style-type: none"> • Manage activities in a network from raw materials to end customer
Chandrasekaran (2010 :4)	SCM is the term used to describe the management of flow of materials, information, and funds across the entire supplier chain, from suppliers to component producers, to final assemblers, to distribution (warehouses and retailers), and ultimately to the consumer.	<ul style="list-style-type: none"> • Management of materials, information, and funds from suppliers to the end consumer
Blackstone & Jonah (2013)	SCM is the design, planning, execution, control, and monitoring of supply chain activities with the	<ul style="list-style-type: none"> • Design, planning, execution, control, and

	objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally.	monitoring of supply chain activities <ul style="list-style-type: none"> • Creation of net value
Lambert, Cooper & Pagh (1998:1)	SCM is the integration of key business processes from the original suppliers to the end user which provides products, services, and information that add value for customers and stakeholders.	<ul style="list-style-type: none"> • Integration of key business processes from original suppliers to end user • Value add at each stage
Künstler (2014: 10)	The term 'supply chain' refers to a network of organisations involved in generating value for the end customer in the form of products and services, via upstream or downstream links in different processes and activities.	<ul style="list-style-type: none"> • Creation of net value for the end customer
Ahmed (2014: 8)	SCM is the coordination of a network of facilities and distribution options that performs procurement of materials, processing the materials into finished products, and distributing the products to customers.	<ul style="list-style-type: none"> • Coordination facilities and processes

Based on the key ideas of supply chain management stated above, the researcher defines the concept of supply chain management as follow:

Supply chain management is the management of activities and processes utilised for the delivery of products, or services, from the original supplier to the end customer with the purpose of generating net value. Supply chain management includes the coordination/collaboration of activities, processes and supply chain partners for the purpose of improving the efficiency and performance of supply chains.

3.4 OBJECTIVES OF SUPPLY CHAIN MANAGEMENT

The definitions of supply chain management indicates that it is a complex undertaking that extends beyond the scope and capabilities of a single organisation. Significant effort is needed to build, and maintain, a supply chain network (CSCMP, Chen, Defee, Gibson & Hanna, 2014). Further, the authors implied that this involves a tremendous action list which requires expertise, time, money establishing strategies, the building of relationships and roles, aligning processes, developing people, implementing technology, and investing in capacity. In addition to the definitions of SCM, it's crucial to state its various objectives. **Table 3.2** presents a variety of objectives of supply chain management (SCM) given by various authors.

Table 3.2: Objectives of supply chain management

Authors	Objectives of supply chain management
Mbang & James (2012: 195)	Supply chain management is aimed at examining and managing supply chain (SC) networks. The rationale for this concept is the opportunity (alternative) for cost savings and better customer service.
Vlerick Business School (2012)	The purpose of supply chain management is to improve the long-term performance of the individual organisations and of the supply chain as a whole.
Rajendra, <i>et al.</i> (2013: 2063)	The main reason and objective of supply chain management is to provide a strategic weapon to build up and enhance sustainable competitive advantage by cost reduction without compromising customer satisfaction.
Basak, <i>et al.</i> (2014: 22)	The objective of SCM is to improve the organisation's profitability and ensuring its survival, as well as the profitability and survival of its customers and suppliers.
Nagurney (2013)	The objective of SCM is to produce and distribute merchandise in the right quantities to the right locations and at the right time at a minimum total system cost, and to satisfy customer service requirements.
Interrait (2013)	The main objective of supply chain management is creating net value, building a competitive infrastructure, synchronising the goods supply, measuring the performance globally and leveraging worldwide logistics.
Habib (2011: 3)	The objective of supply chain management is to incorporate activities across, and within, organisations to provide customer value.

In summary, the major objectives associated with supply chain management approach, is to provide a strategic weapon to create a sustainable competitive advantage; to improve the

profitability as well as the survival of its organisation, its customers and suppliers; to provide customer value; to create net value; building a competitive infrastructure; creating cost savings and better customer service; to improve long-term performance of the individual organisations and of the supply chain as a whole, and finally to produce and distribute merchandise in the right quantities to the right locations and at the right time.

3.5 IMPORTANCE OF SUPPLY CHAIN MANAGEMENT

The importance of supply chain management for economic development, the business world and governments is clearly reflected in the statements below.

The business community, whether a large multinational enterprise group, a micro organisation or state-owned enterprise, pays a high degree of attention to supply chain management as a means to deal with times of the financial difficulties, proposed economic development and a need to change (Wei & Xiang, 2013: 279). The supply chain management has become an important approach within management in developed countries since the 1990s (Jraisat, 2011: 2). Due to globalisation and information communication technology (ICT), supply chain management has become a tool for organisations to compete effectively, either at a local level, or on a global scale (Admin, 2016). Organisations all over the world are pursuing supply chains as the latest methodology to reduce costs, increase customer satisfaction, better utilise assets, and build new revenues (Deveshwar & Rathee, 2010: 193). Supply chain management plays a vital role in enabling a business to face and cater the contextual challenges: this is because supply chain management enhances the business's capacity to increase the competitiveness of the supply chain framework (Choudhary, Ansari, Ahmed & Hammayun, 2014: 530). Through supply chain management, many organisations and supply chains can join forces to establish a supply network with an unbeatable competitive advantage (Deveshwar & Rathee, 2010: 193).

To remain competitive, organisations must recognise the importance of supply chain management practices that not only improve their own performances, but also coordinates with their supply chain partners to improve their joint performance (Cook, Heiser, & Sengupta, 2011: 105; Interrait, 2013). Supply chain management has emerged as a necessity, especially for the

manufacturing industry, when it comes to delivering products at a competitive cost and at a higher quality than their competitors (Admin, 2016). Kumar and Nambirajan (2013: 399) agreed that supply chain management is an important determinant of the success or failure of any manufacturing organisation. Sabry (2015: 251) concurred that it is absolutely essential for executives of manufacturing organisations to be thoroughly aware of all the essential components of supply chain management. The author also mentioned the importance of understanding the impact that it might exert on the overall efficiency of the organisation, since this knowledge will enable them to focus on these variables which add values to organisations and even support the significance of supply chain management.

In addition to the importance on a strategic level discussed above, SCM is also important on an operational level:

- Profitability can be improved by assessing the operational strategies that impact the purchasing, production, logistics management, and also analyses the entire flow of goods and services in the supply chain (Weeks & Mileski, 2013: 105).
- Customer satisfaction and the organisation success can be ameliorated by improving operational efficiency (Interrait, 2013).
- SCM on operational level reduces inventory costs; provides a better medium for information sharing between partners; improves customer satisfaction, as well as service; maintains better trust between partners (organisations in the supply chain); improves process integration; improves bottom line (by decreasing the use of fixed assets in the supply chain); increases cash flow; improves quality; and, gives higher profit margins (Interrait, 2013).

In conclusion, all the benefits associated with a supply chain management approach have emerged as one of the most powerful business improvement tools around (Deveshwar & Rathee, 2010: 193).

In section 3.3, a definition of supply chain management was provided as derived from other definitions found in the literature:

Supply chain management can be defined as the management of activities and processes utilised for the delivery of products and services from the original supplier to the end customer with the purpose of generating net value. Supply chain management includes the coordination/collaboration and integration of activities, processes and supply chain partners, as well as maintaining good relationships within and between organisations for the purpose of improving the efficiency and performance of supply chains.

3.6 THE HIERARCHY OF SUPPLY CHAIN MANAGEMENT

From the previous discussions above, such as key concepts, objectives and importance, it becomes clear that SCM involves different levels from strategic to operational. A discussion of SCM on different hierarchical levels may provide deeper insight to the phenomenon.

The supply chain management hierarchy deals, on the highest level, with strategies in line with corporate strategies, and communicates them down to the tactical and operational levels for efficient implementation (Varghese, 2010). The supply chain management hierarchy ensures proper delegation of roles and responsibilities at various levels in accordance with the organisation's line of business (Hierarchy structure, 2013). The three levels of activities of supply chain management: strategic, tactical and operational will be discussed below.

Figure 3.2 provides the hierarchy of supply chain decisions with their respective levels of activities.

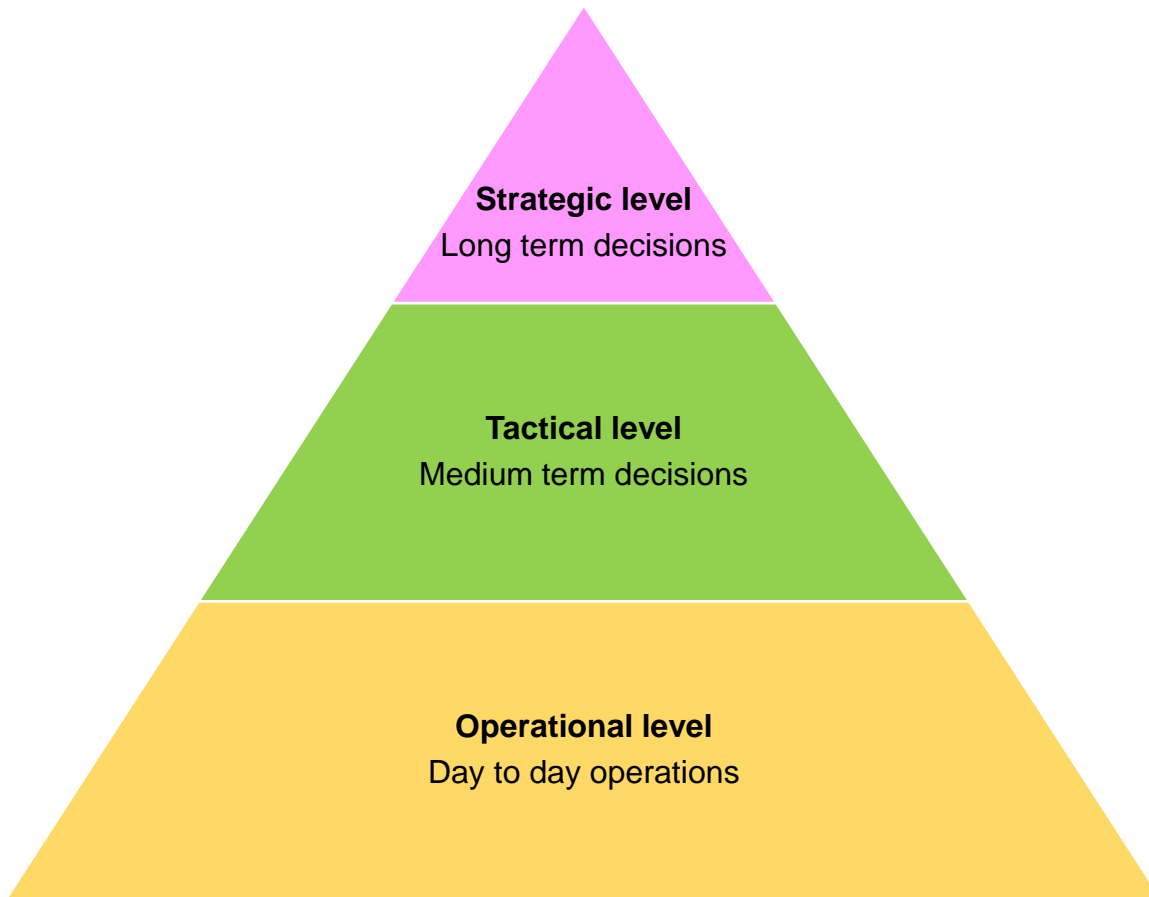


Figure 3.2: Hierarchy of supply chain decisions

Source: Adapted from Basak, Seddiqe, Islam and Akanda, 2015.

In the following discussions of the three levels of activities, decision criteria and function will be discussed on each level.

3.6.1 The strategic level

This particular hierarchical level is involved in taking the long term decisions as indicated in **figure 3.2**. The strategic decisions concern configuration decisions of the entire chain (Hübner, Kuhn & Sternbeck, 2013: 517). These include decisions regarding the number, location and capacities of warehouses and manufacturing plants, or the flow of material through the logistics network (Melo, Nickel & Saldanha-Da-Gama, 2009: 403). Due to the large investments normally associated with this type of decisions, stability with respect to the configuration of the

supply chain network is a highly desirable feature (Melo, *et al.*, 2009: 403). As reported by Hasan, Eckert and Earl (2011: 185), the strategic decisions criteria are:

- Goals of the business
- Recognising vision
- Recognising patterns
- Recognising trends
- Recognising priorities
- Recognising mission
- Context of the situation
- Long term decisions
- Top management involved

According to Professional Development Training (2014), when strategic planning is conducted, every major factor affecting the supply chain, such as consumers, suppliers, transportation, organisational goals, resources, etc. are analysed, and its use and value determined. In addition to that, at the strategic level, issues include:

- Choosing the resources
- Calculating costs
- Establishing customer demand
- Product management
- Carrying out innovations and experiments to meet customer demand
- Finding methods to make the chain more effective

Strategic level is a vital level of supply chain management, as creating an effective strategic plan ensures the success of the other two levels (Professional development training, 2014). Heyns and Luke (2012: 120) provided a list of the ten most challenging job functions to fulfill for each of the management levels.

According to Heyns and Luke (2012: 120), the list of job functions under this hierarchy are ranked as follow: 1. Managers (including: supply chain, logistics and import); 2. Executives and directors; 3. Schedulers and planners (including: demand and material); 4. Procurement; 5. Analysts; 6. Supply chain network designers; 7. Supply chain specialists; 8. Supply chain strategist; 9. Business development; and 10. Consultants.

As indicated previously, the personnel under this hierarchy are engaged in determining the plant location and networking system so that the right quantity of resources can be availed at the right time in a cost effective manner (Hierarchy Structure, 2013).

From the above, it seems that even lower job functions contribute or participate on a strategic level in supply chain management.

3.6.2 The tactical level

After the broader planning, where long-term suitability of operations are carried out, at the tactical level, planning on how the short-term goals must be met is done (Professional Development Training, 2014). This particular hierarchal level is concerned with medium term decisions as shown in **figure 3.2**. This supply chain management hierarchy takes short-term decisions regarding weekly demand forecasts with the help of primary and secondary market data, trend analyses, etc. Here, activities of production planning, and planning of material requirements, are also carried out by choosing the right linear programming software (Hierarchy Structure, 2013; Murray, 2016; Ahmed, 2014: 11; Asefeso, 2012: 11; Varghese, 2010; Po, 2012). As reported by Hasan, *et al.* (2011: 185) the tactical decisions criteria are:

- How to achieve the strategic goals
- Mid-term decisions
- Mid-level management involved
- Context of the situation

According to Professional Development Training (2014), the short-term goals on this level may include:

- Finding new suppliers or engaging with current ones better
- Ensuring the required materials and human resources
- Creating schedules for suppliers and employees
- Ensuring transportation needs are met
- Developing methods to better synchronise supply and demand
- Looking at warehousing facilities

According to the research of Heyns and Luke (2012: 120), the following functions operate on, or contribute to, a strategic level in supply chains: Managers (including: warehousing, transport, distribution center, demand); 2. Planners (including: demand, inventory and replenishment); 3. Supply chain and business analysts; 4. Supply chain specialists and consultants; 5. Supervisors; 6. Procurement staff; 7. Warehouse staff; 8. Customer service staff; 9. Industrial engineer; and 10. Information technology.

3.6.3 The operational level

This hierarchical level deals with day to day operations as indicated in figure 3.2. While the supply chain is running, problems of operative order planning, supply chain monitoring, and reconfiguration in the case of operative disruptions (i.e., machine failures, human errors, information systems failure, cash-flow disruption, or simply catastrophic events) are to be solved (Ivanov, 2010: 4). This hierarchical level is concerned with the ultimate execution of the supply chain activities, in line with supply chain strategies, at the floor level as communicated and directed by the preceding hierarchies (Hierarchy Structure, 2013; Murray, 2016; Ahmed, 2014: 11; Asefeso, 2012: 11; Varghese, 2010). It needs to be noted that success at this level heavily depends on decisions made by the other two levels (Professional Development Training, 2014). In addition to that, without effective planning for both long-term and short-term, operations on a daily basis cannot be improved to reach maximum productivity.

The operational level activities in the supply chain involves the following activities (Professional Development Training, 2014):

- Ensuring that supply is consistent and the demand is met
- Keeping an account of progress, materials and human resources
- Managing materials, operations and human resources
- Making sure that waste is reduced/removed

According to the research of Heyns and Luke (2012: 120), the following job functions operates on, or contribute to, an operational level in the supply chain: 1. Managers (including warehouse, transport and logistics); 2. Drivers (truck); 3. Transport planners (e.g. routing and scheduling); 4. Stores and warehouse staff (including: checkers and pickers); 5. Controllers and supervisors; 6. Procurement staff; 7. Clerks (including: admin and financial); 8. Customer service; 9. Inventory controller; and 10. Data (capturers and modelling).

The efficiency and applicability of the decisions decrease if decision-supporting models are considered in isolation for different supply chain managerial levels and structures (Ivanov, Sokolov, & Kaeschel, 2010: 5). The interrelation of these three management levels is very important, since it allows people to realise the construction of realistic plans balanced with each other, and to provide feedback for the adaptation of these plans, taking into account the real performance of supply chain processes (Ivanov, 2010: 7).

3.7 REQUIRED SKILLS OR COMPETENCIES OF SUPPLY CHAIN PERSONNEL

The changing business environment and the emergence of global marketplaces have, in recent years, created a supply chain profession that demands a different set of skills and competencies to manage globe spanning supply chains successfully (Hohenstein, *et al.*, 2014: 435). As the supply chains restructure themselves globally, individuals hoping to secure new roles or promotions within it, have an obligation to realign their skillsets in accordance with market demands and requirements (Davis, 2015). Effective skills and development plans start by

defining the skills needed to be successful in the end-to-end supply chain, in a particular supply chain discipline, and in specific job roles (Scott, 2016). Moreover, the author stated that this requires an ongoing effort by leadership and human resources to align, document, and communicate these skills as supply chains evolve. Therefore, organisations should be more proactive and flexible in their approach to recruiting, developing, and retaining the supply chain talents for the purposes of keeping a competitive advantage over their competitors (Cottrill, 2010: 1). For example, supply chain personnel should be more flexible team workers with leadership abilities, and possess good communication skills to enable them to communicate across functions and organisations in order to promote and coordinate supply chain management (Prajogo & Sohal, 2013: 1533).

Cottrill (2010: 4) offers the following reasoning for the significance of each of the requisite skills for supply chain managers suggested in his ‘white paper’:

- **Higher order problem solving abilities:** “Supply chain management is not just a numbers game – analytical and technical skills are necessary, but creative thinking and the ability to see the big picture is equally important”.
- **Managing ambiguity:** “Supply chain managers should be able to ‘navigate in a fog’ – general business managers with high order diplomacy and commercial awareness who can learn from past experiences and apply that learning in new imprecise situations are needed”.
- **Multi-level communicator:** “Ability to converse horizontally and vertically within organisations and across communities of trading partners and be able to explain the supply chain management concept in simple terms to diverse organisational constituents”.
- **World citizen:** “Manage and relate to teams located in multiple countries can no longer assume all reports will be from the same nation”.

In addition, managers who work in supply chains today need to be dynamic, able to work long hours, and travel across the world. They have to be able to be politicians, managers and designers if they want their organisations to truly benefit from their manufacturing and transportation process (Taylor, 2016). According to Künstler (2014: 12), supply chain generalists, experts and managers should have the following abilities:

- **Supply chain experts and managers** should be capable of understanding and managing system and methods, actual production processes as well as material and information flows. This capability requires emotional and social moderating as well as communication skills. In addition to problem solving skills, such as analytic abilities. In other words, supply chain experts and supply chain managers must be generalists in their field of knowledge.
- **Supply chain managers as generalists** need to be familiar with the actual situation and processes along the supply chain and understand the methods, organisational forms and tools to be used. A basic understanding of controlling, business economics and IT systems, i.e. in ERP (Enterprise Resource Planning), APS (Advanced Planning System), EDI (Electronic Data Interchange) and MES (Manufacturing Execution System) are required. From this source, the conclusion can be made that supply chain managers and experts need to be generalists on a *higher* and generalists on a *lower operational* level.

Competencies in hard analytical skills are no longer sufficient; supply chain managers must also excel in soft skills such as leadership and creativity (Taylor, 2016; Ellinger & Ellinger, 2014: 121). According to Taylor (2016), positions in supply chain management has grown or developed, for example from being a logistics operator responsible for shipping, to being a supply chain engineer. In addition to that, employees on higher levels in supply chain management need skills in operations research, supply chain engineering, statistical process control, data analysis and simulation; they further need emotional intelligence, the ability to manage relationships with internal and external customers and suppliers. Even at the entry level, it is often difficult to find qualified employees with the highly specialised expertise to

perform their job tasks because the field has developed far beyond pure material supply or logistics, so the required qualifications have become much broader (Taylor, 2016). **Table 3.3** presents a summary of the requisite skills for effective supply chain managers proposed in recent studies (Ellinger & Ellinger, 2014: 122). The authors also mentioned that there is a considerable overlap between the competencies in each of the studies summarised.

Table 3.3: Requisite competencies for effective supply chain managers

Study	Competencies
Cottrill (2010: 11)	<ul style="list-style-type: none"> • Higher order problem solving • Adeptness at managing ambiguity • Ability to communicate horizontally and vertically within and between organisations • Manage teams located in numerous countries
Slone, <i>et al.</i> (2010:83)	<ul style="list-style-type: none"> • Global orientation • Cross functional, cross organisation understanding • Leadership skills • Technical and analytics savvy • Superior business skills
Christopher (2012: 5)	<ul style="list-style-type: none"> • Adept with the classic tools and techniques for managing ongoing operations • Understand complex systems theory and process management in horizontal organisational structures • Effective team leadership • Change management and influencing skills
Fawcett, <i>et al.</i> (2010: 23)	<ul style="list-style-type: none"> • Cross-functionalism • Choreographer • Coach • Champion
Bharthvajan (2014: 10164)	<ul style="list-style-type: none"> • Deeper knowledge of technology fundamentals • Strong communication and collaboration skills • Ability to learn new things faster • Good team management skills • Flexibility to adopt to new roles • Ability to get work done

	<ul style="list-style-type: none"> • Analytical skills and problem-solving ability
Jordan & Baak (2016: 616)	<p>Strategic skills including:</p> <ul style="list-style-type: none"> • Boundary spanning management • Work experience partnering with industry • Market understanding and customer service • Business ethics <p>Process management skills including:</p> <ul style="list-style-type: none"> • Project management • Training • Regulations <p>People management skills including:</p> <ul style="list-style-type: none"> • People management • Team work • Leadership skills • Collaborative learning <p>Decision making skills including:</p> <ul style="list-style-type: none"> • Problem solving • Organisational skills • Planning skills • Flexibility • Initiative <p>Behavioural skills including:</p> <ul style="list-style-type: none"> • Communication • Time management • Motivation and enthusiasm • Stress management <p>Quantitative skills including:</p> <ul style="list-style-type: none"> • Finance and numeracy • Information technology • Analytical and statistical skills <p>Negotiation skills including:</p> <ul style="list-style-type: none"> • Management of complexity and change • Negotiation

Source: Adapted from Ellinger & Ellinger, 2014: 122; Bharthvajjan, 2014: 10164; Jordan & Baak, 2016: 616.

In the table above, a summary of many literature sources was made of the required competencies or skills for the effective and efficient management of supply chains. The list provided in **table 3.3** can be synthesised to three main competency categories:

- Analytical abilities
- Interpersonal skills
- Managerial skills

The above list indicates competencies that are obviously not required on all levels in the supply chain. In the discussion below the competencies on different levels in supply chain management is provided.

3.7.1 REQUIRED COMPETENCIES AT TOP LEVEL IN SUPPLY CHAIN MANAGEMENT

It is obvious from the discussion in the previous sections, that on top management level in SCM a variety of special competencies are required. **Table 3.4** below provides a list of the competencies that supply chain managers on the top level require, in three different categories, including analytical abilities, interpersonal skills and managerial skills.

Table 3.4: Competencies of supply chain personnel at top level

Analytical abilities	Interpersonal skills	Managerial skills
<ul style="list-style-type: none"> • Is capable of identifying problems • Creative thinking and the ability to see the big picture • Is able to co-ordinate all supply chain activities • Able to be dynamic, work long hours and travel around the world 	<ul style="list-style-type: none"> • Social moderating and communication skills • Flexible team workers with leadership abilities • Is capable of solving problems and others that might arise • Is able to manage relationships with 	<ul style="list-style-type: none"> • Global orientation • Cross functional, cross-organisation understanding • Leadership skills • Technical and analytical skills • Superior business skills

<ul style="list-style-type: none"> • Skills in operations research, supply chain engineering, statistical process control, data analysis and simulation • Generalists in their field of knowledge 	<p>internal and external customers and suppliers.</p> <ul style="list-style-type: none"> • Ability to negotiate • Higher order diplomacy and commercial awareness • Emotional intelligence 	
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Source: Adapted from Slone, *et al.*, 2010; Taylor, 2016; Cottrill, 2010: 4; Künstler, 2014: 12; Jordan and Bak, 2016: 616.

3.7.2 REQUIRED COMPETENCIES OF SUPPLY CHAIN PERSONNEL AT MIDDLE LEVEL

As can be deduced from discussions in previous sections, supply chain personnel need special skills, but on a lower level. **Table 3.5** provides a list of the competencies that supply chain managers on the middle level requires, in two different categories, including professional attributes and interpersonal skills.

Table 3.5: Competencies of supply chain personnel at middle level

Professional attributes	Interpersonal skills
<ul style="list-style-type: none"> • In depth knowledge of technology fundamentals • Works well with different departments and other departments in the supply chain • Ability to learn new things fast • Ability to get work done • Flexibility to adopt to new roles 	<ul style="list-style-type: none"> • Strong communication and collaboration skills • Good team management skills • Negotiation skills • Analytical skills and problem-solving ability

Source: Adapted from Bharthvajan, 2014: 10164; Jordan & Bak, 2016: 616.

3.7.3 REQUIRED COMPETENCIES OF SUPPLY CHAIN PERSONNEL AT LOWER LEVEL

It also became clear from previous discussions that even on a lower, operational, level, supply chain personnel needs special competencies or skills. **Table 3.6** provides a list of the competencies that supply chain personnel on lower level requires, in two different categories, including professional attributes and interpersonal skills.

Table 3.6: Competencies of supply chain personnel at lower level

Professional attributes	Interpersonal skills
<ul style="list-style-type: none">• Enthusiasm for supply chain management• Flexibility• Strong writing abilities• Inventory/material management comprehension• Understanding of logistics and procurement	<ul style="list-style-type: none">• Analysis, judgement and decision-making• Team work skills• People skills• Commercial awareness• Group discussion/problem-solving exercise

Source: Adapted from Target Jobs, 2016.

3.7.4 ROLES IN CAREER STAGES IN SUPPLY CHAIN MANAGEMENT

In the discussion in 3.7.1, 3.7.2 and 3.7.3, it became clear that personnel on different levels in the supply chain needs a different competency and skills set. It is obvious that as personnel develop and get promoted, they acquire, or need to acquire, additional skills or competencies. Consequently, the knowledge, skills and abilities of supply chain management (SCM) personnel must advance along with career stages (SCMA, 2016). There are three specific roles for supply chain management personnel as they progress through their careers (SCMA, 2016). This is shown in **table 3.7** below:

Table 3.7: Specific roles for supply chain management personnel

Role of the supply chain management (SCM) personnel	Operational: Provider of business support and information	Tactical leader and operational decision-maker	SCM leader and strategic decision-maker
Competency	Early career	Mid-career	Career peak
Tool or Technique	Know	Do or apply	Lead
Software or Service	Research and evaluate	Select	Oversee implementation
Concept or Topic	Explain phenomena	Manage tactical assignments	Lead strategic initiatives

Source: Adapted from Supply chain management Alberta (SCMA), 2016.

In summary, the required competencies of supply chain personnel vary according to the supply chain management level they operate on. At the strategic management level of supply chain management, which is represented as the career peak, the supply chain personnel should have competencies in terms of their analytical abilities, interpersonal skills and managerial skills. At the tactical level of supply chain management, which is considered as the mid-career, the supply chain personnel should have competencies such as: strong communication and collaboration skills, good team management skills, negotiation skills, analytical skills and problem-solving abilities in supply chain management. At the operational level of supply chain management, which is regarded as the early career, the required supply chain personnel should have basic competencies such as: analysis, judgement and decision-making, team work skills, people skills, commercial awareness, group discussion/problem-solving exercises in supply chain management. For effective supply chain management, it is crucial to ensure that the appropriate skillsets of supply chain personnel correspond to appropriate levels of supply chain management.

3.8 The advantages associated with the close alignment of human resource management with supply chain management

According to Vlerick Business School (2012), it is clear that human resource management possesses the ability to improve supply chain management as a whole. The close alignment of the two disciplines (supply chain management and human resource management) could help

overcome the frequent complaint by human resource management managers that their strategy does not align with that of the overall organisation, and can in fact produce a number of progressively broader benefits (Vereecke, 2012). Anastasiou (2012:2) asserted that an effective human resource management policy is particularly important in logistics and supply chains. Vereecke (2012) stated that the benefits of the close alignment of human resource management with supply chain management can lead to a business with a clearer definition of its overall strategy. Therefore, the author implied that if organisations can employ human resource management practices to align an entire connected workforce, then the long-term improvements in productivity and efficiency should be enough to convince businesses to re-think the relationship between human resource and supply chain management. According to Vlerick Business School (2012), traditionally, human resource strategy involves developing flexible systems of HR best practices that promote an organisation's business strategies.

Numerous studies have reported some significant improvements and benefits in terms of their performance when applying purposeful HR practices to their supply chains. **Table 3.8** shows the findings of previous studies of human resource practices in supply chain management.

Table 3.8: Previous studies on human resources practices in supply chain management

RESEARCHERS	SECTORS	FINDINGS AND RECOMMENDATIONS
Othman & Ghani (2008: 259-262)	Automotive industry, food industry and printed circuit board manufacturer.	Findings: Provided evidence that there was a positive relationship between purposeful and appropriate human resource practices and supply chain management success. Recommendations: The adoption of supply chain management needs to be supported by specific human resource management practices.
Khan, <i>et al.</i> (2013: 177-189)	Small and medium sized enterprises (SME)	Findings: Results revealed that supply chain management success is activated by human resource management practices such as: training, evaluation and compensation. Recommendations: They suggested that SME owners/managers should focus on enhancing the supply chain management success by implementing sophisticated human resource management practices. This integration will allow mapping unique strategies to gain an edge over competitors. Appropriate approaches should

		be considered at national level to boost the national economy through SME sector.
Menon (2012: 779-783)	US manufacturing organisations	<p>Findings: Specific human resource practices, such as job descriptions and teamwork training, are important for successful supply chain integration. Flexible job description, team organisation, teamwork training and the use of performance metrics to determine rewards, are significantly related to satisfaction with supply chain performance.</p> <p>Recommendations: Flexible job descriptions, the use of teams to coordinate activities internally with other departments, and skills are significant drivers of satisfaction with regard to delivery performance. While practices such as training in partner selection, and training in partner evaluation, help with supply chain integration, it is training in teamwork skills that help employees in their day-to-day interactions within the organisation and with partners to positively influence SC performance with regards to cost and suppliers.</p>
Swart, <i>et al.</i> (2012: 11-18)	Manufacturing organisations	<p>Findings: Human resource management practices can help organisations achieve and maintain superior human performance in the supply chain.</p> <p>Recommendations: They suggested that future supply chain management research should incorporate human performance as an important construct.</p>
Koulikoff-Souvion & Harrisson (2010: 913-933)	Large European pharmaceutical organisation	<p>Findings: Interdependent operations (in supply chains) requires an HR system that is designed to invest heavily in the relationships, and which is aimed at all employees involved in the interaction of the intra-firm supply chain, not just top management. Also, HR practices could have positive and negative effects in the supply chain. The effects will remain negative if HR practices are implemented with specific and distinct goals among functional areas, causing internal disputes, and not focused on the overall performance of the supply chain.</p>

		Recommendations: A focus on employees and jobs related to broad supply chain rather than local optimisation. Encouragement of information and knowledge sharing and relational abilities that allow employees to leverage value. A collective reward system that support the achievement of mutual and interdependent goals.
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3.9 CONCEPTUAL MODEL

Findings of previous studies (refer to **table 3.8**) about the role of human resource management in supply chain management effectiveness, revealed a significant interdependence between human resource management practices and effective supply chain management. Results also demonstrated the crucial and vital role that human resource practices play in the implementation of effective supply chain management. The two main constructs of this study are: effective supply chain management as a dependent variable, and human resource management practices as an independent variable. The human resource practices usually considered in the literature on people management in supply chain management are: (i) staffing, (ii) job design, (iii) performance appraisal, (iv) rewards and compensation, (v) training, (vi) socialisation and (vii) communication (Shub & Stonebraker, 2009:34; Koulikoff-Souvion & Harrison, 2010: 922). Some of these human resource management practices formed the basis for the research instruments originally developed by Chew (2004: 242-248) and later adapted by Khan, *et al.*, (2013). These research instruments (of Chew and Khan) form the bases of a conceptual model that directed this study, which was eventually adapted and further developed as the research instrument (questionnaire) for this study. Accordingly, these six practices formed the basis for a six dimension conceptual model which was applied in the empirical study: selection, evaluation, training, compensation, communication and socialisation (refer to **figure 3.3**). As previously mentioned, a conceptual model was used to direct the study to investigate to what extent human resource management practices are implemented to enhance effective supply chain management in a South African manufacturing organisation.

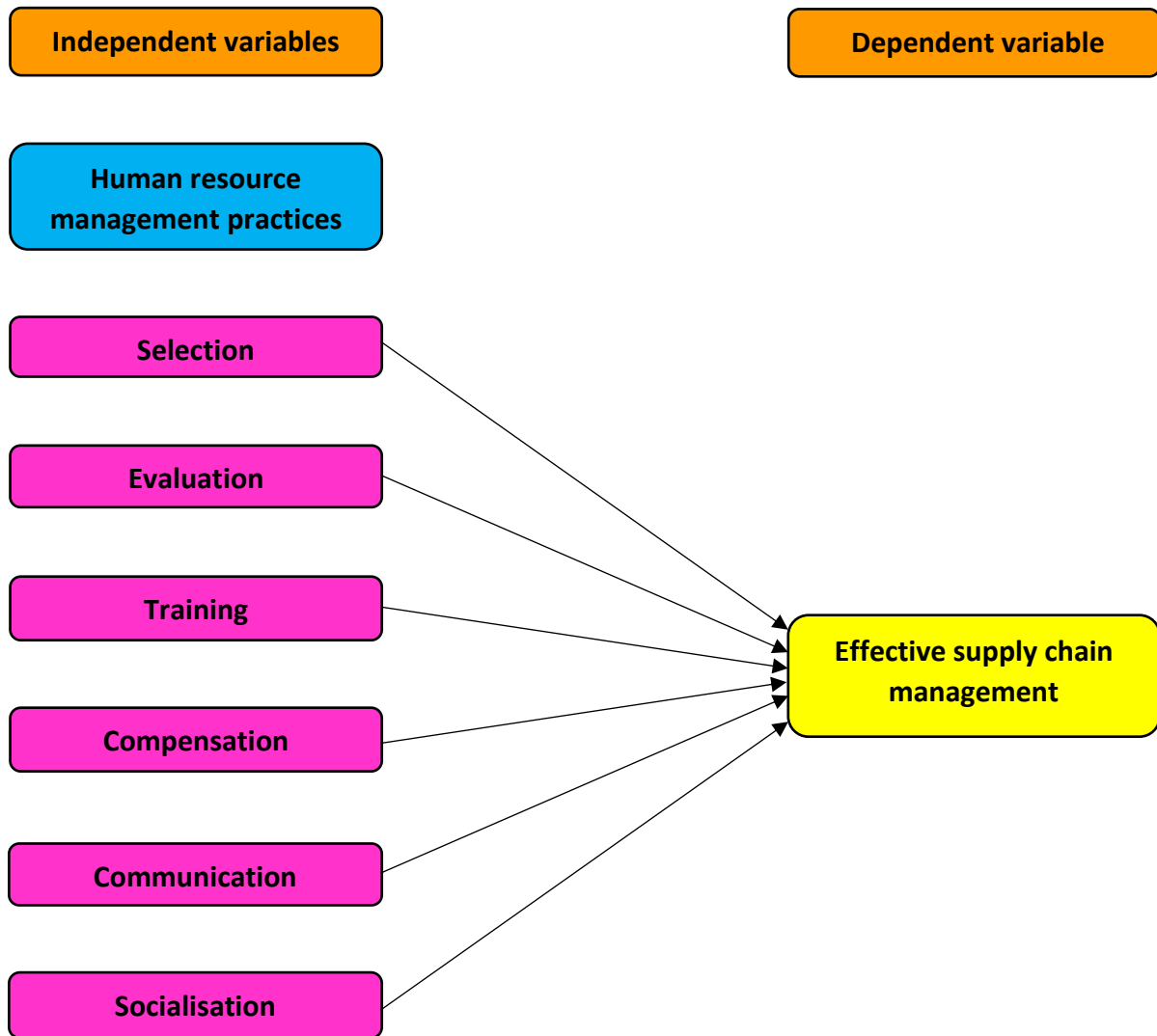


Figure 3.3: Conceptual model of the relationship between human resource management practices and effective supply chain management

Source: Adapted from Koulikoff-Souvion & Harrison, 2007.

3.9.1 DISCUSSION OF THE CONCEPTUAL MODEL

As indicated in sections 2.7.2.1 to 2.7.2.6, a discussion in general of the six human resource management practices was provided. However, this (section 3.9.1) offers the linkage between each of the six human resource management practices and effective supply chain management.

3.9.1.1 HR practice 1: Selection and effective supply chain management

Recruiting is the human resource management process utilised to identify and select the right candidates with the knowledge, skills, and attributes necessary to support the organisational talent strategies and needs required to manage supply chain operations (USAID, 2010: 1). HR departments play a critical role in recruiting capable talents, and they are also often charged with the development, or procurement, of training programs to prepare recruits for specific jobs in their organisation (Swart, *et al.*, 2012: 16). Strategic recruitment creates a pool of qualified candidates which ensures better selection (USAID, 2010: 1). A good recruitment for attracting workers for working in supply chain management is necessary (Mguni, 2014: 8).

Selection is the process of selecting and assigning appropriate persons to specific supply chain-related positions (Swart, *et al.*, 2012: 16). When workers are selected based on possession of certain competencies which support organisational goals, recruiting can add the value to an organisation (USAID, 2010: 1) as also mentioned in section 2.4.1.1. Throughout the selection process, it is the responsibility of the candidate to demonstrate not just his/her experience and background in similar positions, but also their flexibility and capability of learning new skills, as well as showcasing their own talents in a new environment (Davis, 2015; Cedeño, *et al.*, 2015: 134). Talent acquisition and development is becoming a fiercely competitive advantage and a robust supply chain strategy can determine which organisation prevails (Scott, Burnette, Dittmann, Stank & Autry, 2015: 10). Vlerick Business School (2012), suggests that applying traditional (intra-organisation) HR planning and recruitment activities to the supply chain partner firms produces these (inter-organisation) benefits:

- Aligning recruitment practices among the supply chain organisation.
- Sharing applicant pools.
- Forecasting labour demand and supply across the entire supply chain.

Hence, selecting the right people with the right competencies in the right places, can facilitate the implementation of effective supply chain management (Swart, *et al.*, 2012: 16; USAID, 2010: 1)

3.9.1.2 HR practice 2: Evaluation and effective supply chain management

Evaluation refers to the formal and informal system of measuring employees' performance related to supply chain management (Swart, *et al.*, 2012: 16). Performance appraisal is an important part of supply chain management (Duanhong, Beibei & Jianzhong, 2010: 789).

Performance appraisal is critical for organisations to improve a supply chain's effectiveness and efficiency (Cai, Liu, Xiao & Liu, 2009: 512). Establishing an effective performance appraisal system of the supply chain, can evaluate the performance and determine the interaction of the performance appraisal indicators perspicuously (Duanhong, *et al.*, 2010: 789). Selecting a suitable measurement instrument and items are critical for successful appraisal. As also indicated in section 2.7.2.2, appraising performance also assumes that performance standards have been set, and that the employee gets feedback to help eliminate performance deficiencies (Dessler, 2012: 158). Having established performance standards and objectives through supportive supervision, the organisation should regularly observe and monitor performance, recognise and reward positive performance, identify and correct problems, and provide feedback which will assist in improving the quality of service (UNICEF, 2014: 15). In addition to this, it provides an opportunity for the organisation to get a good sense of an employee's performance, based on real examples and evidence, in order to address weaknesses immediately while providing guidance, support and training. According to Vlerick Business School (2012), HR performance appraisal systems can be leveraged across the supply chain to reap greater benefits such as:

- Developing performance metrics for the supply chain.
- Aligning performance appraisal dimensions across supply chain partners.
- Learning from supply chain partner feedback on individual and group performance.

A study revealed that performance evaluation positively impacts supply chain management success (Khan, *et al.*, 2013: 185). Hence, appraisal and evaluation might enhance the implementation of effective supply chain management.

3.9.1.3 HR practice 3: Training and effective supply chain management

Formal training of supply chain personnel represents a substantial investment for organisations (Mandaza, Goriwondo & Leipzig, 2012: 228). Training involves changing skills, knowledge, attitudes, or behaviour. Training programs educate employees on necessary knowledge and skills so that they can perform assigned supply chain tasks to the specified standards (Swart, *et al.*, 2012: 17). The most effective training is tailored to the supply chain organisation and its mission within the organisation (Scott, *et al.*, 2015). As previously mentioned, Menon (2012) concluded that it is training in teamwork skills which helps employees in their day-to-day interactions within the organisation and with partners, to positively influence supply chain performance with regards to costs and suppliers. Organisations that consider collaborative and integrated supply chain management to be a strategic competitive tool, can be expected to invest in appropriate training (Menon, 2012: 774). Training should be viewed as supply chain wide, including supply chain partners (suppliers and customers). HR should identify the specific training requirements of each partner in the supply chain (Vereecke, 2012). By not doing so, the organisation will not isolate the benefits of a training intervention to one section of the supply chain, but supply chain wide. Providing opportunities for individuals to learn new skills and enhance their professional qualifications, helps to keep them engaged and challenged (Cottrill, 2010: 11). Moreover, this is particularly important in supply chain, given the pace at which the profession is evolving. According to Vlerick Business School (2012), broadening applications of HR training activities should include:

- Identifying training needs and objectives specifically for supply chain positions, and designing training to meet those needs.
- Identifying the training needs of the supply chain partners, and training these partners (or vice versa).
- Joint training and cross-organisational training of workers across the supply chain.

A recent study revealed that training has a significant positive effect on supply chain management success (Khan, *et al.*, 2013: 185). Therefore, training can enhance the implementation of effective supply chain management by filling the gap in the skills shortage especially in South Africa where the issue has reached a critical point.

3.9.1.4 HR practice 4: Compensation and effective supply chain management

As reported by Anastasiou (2012: 7), an effective human resource management policy should encourage innovation, with recognition and reward of managers, teams and individuals. Further, the author stated that several other human resource management policy parameters also constitute a significant element of the potential improvements for logistics and supply chain management. Smith-Doerflin, Tracey and Tan (2011: 202) emphasised that people undertake activities and adopt behaviours for which they are rewarded. They are motivated because they receive fair compensation and benefits. When the reward system can be perfectly aligned with an organisation's appraisal and evaluation, it can become an effective motivation method. Expectancy theory posits that pay level will influence performance when: (i) employees perceive the relationship exists between their efforts and performance; and (ii) employees gain specific benefits if they perform well (Vlachos, 2009: 3). Organisations need to reward their talent, and industry trends clearly indicate that pay-for-performance is drawing a renewed focus from executives (Newell, 2012; Vereecke, 2012). Organisations have the opportunity to capitalise on innovative reward strategies that attract and engage top talent (Newell, 2012).

When HR managers attempt to source the best possible talent to recruit into an organisation, incentives in pay and other contractual benefits are offered to attract a prospective employee (Vereecke, 2012). Mu and Yu (2017:1) indicated that a reasonable incentive mechanism in a supply chain is an effective way to arouse the enthusiasm of each supply chain partner, or node enterprise, and improve the entire supply chain's performance.

The study by Khan *et al.* (2013: 185) revealed that compensation positively impacts supply chain management success. Another study done by Menon (2012: 769) indicated that the use of performance metrics to determine rewards is significantly related to satisfaction with supply

chain performance. Therefore, this suggests that rewards can ameliorate the implementation of an effective supply chain management.

3.9.1.5 HR practice 5: Communication and effective supply chain management

According to Chandrasekaran (2010: 516), communication is another important human resource (HR) people-related function for effective supply chain organisation. This practice involves designing and implementing the data exchange systems needed to achieve the instantaneous transfer of data, both within the organisation, and among the entities involved in the supply chain (Crandall, Crandall & Chen, 2011: 401). It has been found that communication seems to act as “cultural glue”, “trade-off and compensation” a “knowledge creation and dissemination”, a “relationship development and maintenance” and an “alignment and integration” activity along the supply chain (SC) (Gambetti & Giovannadi, 2013: 390). The effective operation of a supply chain, requires internal and external synchronisation, flexibility, data sharing and communication within, and between, organisations and departments (Anastasiou, 2012:7). As reported by Linton (2010), effective communication drives supply chain performance. Effective communication throughout the supply chain helps an organisation improve the efficiency of its logistics operations. Research further suggests that internal integration enables external integration because organisations that effectively communicate, share information, and collaborate across functional areas in their own organisations, tends to be proficient at doing the same with external supply chain participants (Flynn, Huo, Zao, 2010: 60; Chandrasekaran, 2010: 516; Anastasiou, 2012: 7). Communication makes information sharing possible. Information sharing has a significant effect on supply chain integration (Pandey, *et al.*, 2012: 114). Information sharing serves as an essential approach for the survival of enterprises. As stated by Linton (2010), communication keeps all members informed of developments that affect their contribution to the supply chain, enabling them to quickly adjust their operations in line with changing demand conditions. Effective communication also enables members to respond rapidly to new business opportunities, helping to get new products to markets quickly, or increasing supply levels following a successful market campaign (Linton, 2010 Scott, 2016). Benefits of effective communication in supply chain management are:

- Increases productivity
- Improves the morale
- Contributes to the building of a successful team

Hence, adequate communication is the key to an effective and robust supply chain management.

3.9.1.6 HR practice 6: Socialisation and effective supply chain management

Ondoro (2015: 859), defined socialisation as the process of interaction and communication between individuals of different organisations, in building improved business relationships as also shown in section 2.7.1.6. Further, the author also mentioned that socialisation may also be understood as the process by which an individual acquires the social knowledge and skills necessary to assume an organisational role. The lack of socialisation has been identified as a key issue in many supply chains (Swart *et al.*, 2012:17). Socialisation enables workers to construct communication to liberally trade personal or specialised knowledge (Ng, *et al.*, 2011: 5). It was suggested that socialisation mechanisms such as team meetings, cross-functional teams, and joint workshops act to connect individuals across both parties, with the resulting pattern of close interaction creating a network of interdependent social exchanges, and increasing the level of mutual trust and respect across the development teams (Lawson, Petersen, Cousins & Handfield, 2009: 157). Effective socialisation offers opportunities for employees to share work related experience, knowledge, concerns, questions, solutions and further helps foster a holistic view of the entire supply chain. Therefore, an organisation that strives for supply chain excellence should make efforts to provide the most suitable platform to foster desired socialisation (Swart, *et al.*, 2012:17). For all elements to operate as a whole, it is essential to manage tensions between supply chain members, and to overcome communication barriers associated with physical, economical, strategic and social criteria (Paché, 2013: 129). The study of Lin (2014: 285) demonstrated that effective socialisation mechanisms, such as information sharing and open communication, can positively impact supply chain integration. Hence, understanding the independent and joint influences of dependence and trust on supply chain integration (SCI), could help practitioners to efficiently and effectively establish and manage their social ties (Zhang & Huo, 2012: 545). The most advanced approaches in terms of supply

chain management starts by integrating the importance of social ties in order to understand how business relationships develop (Paché, 2013: 127). Thus, socialisation can reinforce the implementation of effective supply chain management.

3.10 CONCLUSION REMARKS

Human resource practices positively influence not only supply chain performance, but also the general outcome of the organisation (UNICEF, 2015). The literature review on human resource management and supply chain management clearly indicates that human resource management practices can enhance the effectiveness of supply chain management when used appropriately.

From the above literature the following broad questions were formulated and formed the basis for the development of the questionnaire:

- How does the organisation select candidates for a position in supply chain management?
- How does the organisation evaluate staff and managers in the supply chain?
- How does the organisation train and develop staff and managers in supply chain management?
- How does the organisation compensate staff and managers in the supply chain?
- How does the organisation communicate within the supply chain management (internal and external)?
- How does the organisation ensure socialisation within supply chain management?

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

Research methodology plays a fundamental role in academic research (Mitra & Borza, 2015: 38). The research methodology presents the philosophical framework in which the research project is developed (Wu & Patel, 2014: 97). Methodologies provide both the strategies and grounding for the conduct of a study (O' Leary, 2013 11). Research methodology also refers to the way in which problems are addressed (Wu & Patel, 2014: 99) and it is also a way to systematically solve the research problem (Makinde, 2013: 14). Research methodology is a general discipline that comprises the tools for developing scientific knowledge and elements involved in both theoretical and empirical research, and studying it provides the premises to access data, techniques and methods required in every research activity, no matter its complexity (Mitra & Borza, 2015: 47). As reported by Long (2014: 428), research methodology is significant, not only because it embodies philosophical assumptions, but also because it guides the selection of research methods. Choosing appropriate research methodologies and methods to pursue a documented research activity, requires not only a complex documentation, but also imposes to find the instruments and methods that can better present and measure the studied phenomenon (Mitra & Borza, 2015: 38). The authors concluded that the aim of the research methodology is to provide the framework for ensuring the planning and the operational activities for the implementation process of scientific procedures.

This chapter starts with an introduction and a definition of research methodology. The chapter then defines research and research design. This is then followed by stating the research questions, the research objectives, the problem statement and the hypothesis. Thereafter, the justification for the research method, the population and sampling, the variables for quantitative research, the research instrument, the data collection, the data analysis, the reliability and validity for this study, the ethical considerations and a summary, are discussed in more detail. The synopsis of chapter 4 is diagrammatically depicted in **figure 4.1**.

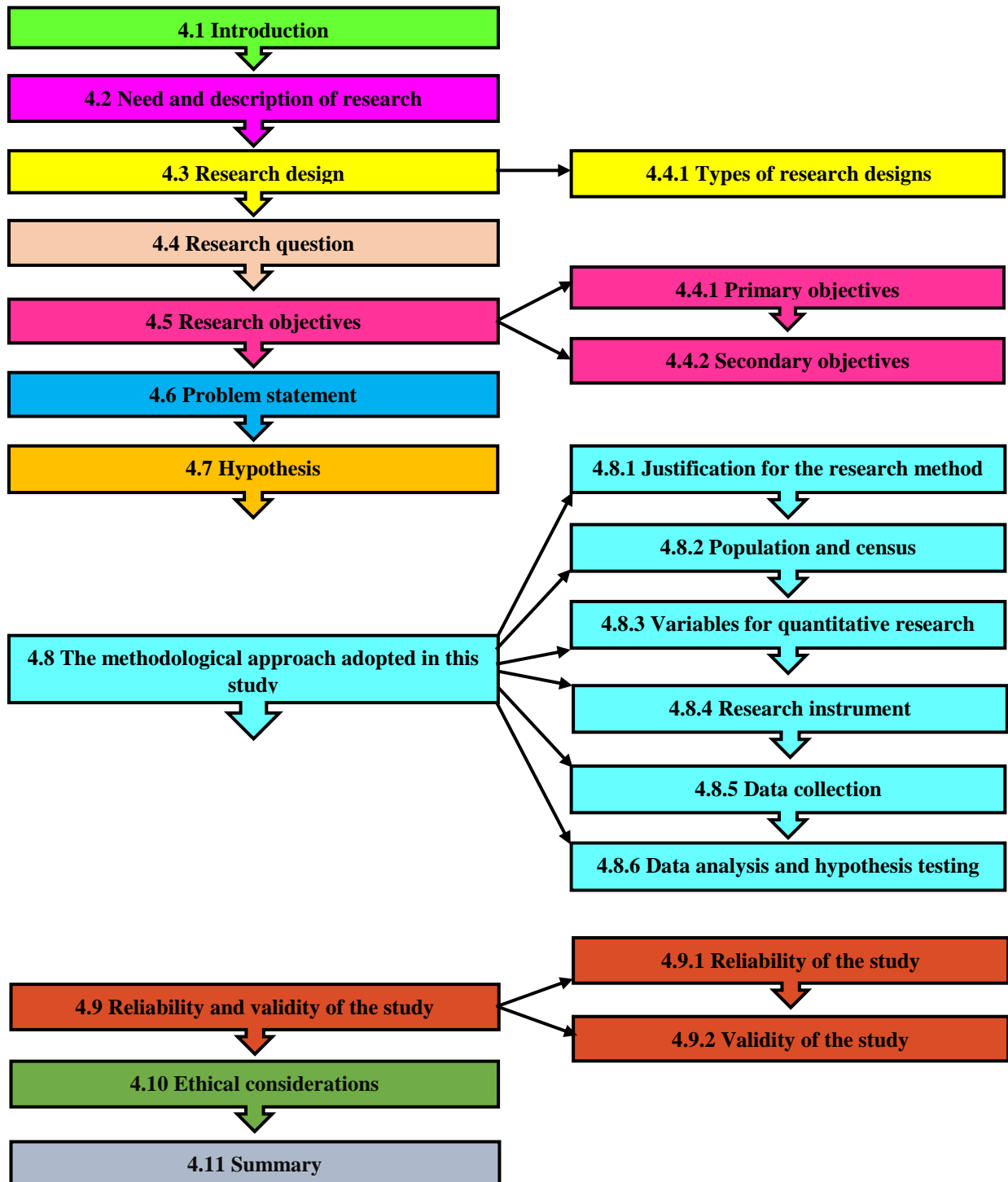


Figure 4.1: Synopsis of Chapter 5

Source: Compiled by researcher

4.2 THE NEED AND DESCRIPTION OF RESEARCH

The word ‘research’ comprises of two words: “Re” and “Search”, which means to search again (Pandey & Pandey, 2015: 7). The meaning of “research” has seen fundamental changes from the 15th century to the 16th century (Ismail, 2015:2). The term “research” was first used in the 1570s to signify the “act of seeking out, searching closely”; the meaning of “scientific inquiry” was first attended in the 1630s; and the phrase research and development was first recorded from 1923 (Dictionary.com, 2016). Research is an intellectual activity, it is responsible for bringing to light new knowledge, and it is further responsible for correcting the present mistakes, removing existing misconceptions and adding new information to the existing fund of knowledge (Pandey & Pandey, 2015: 7; O’ Leary, 2012: 14). Barua and Sinha (2015: 2) define research as a:

- Thorough systematic investigation
- Careful or diligent search, studious inquiry
- Endeavour to discover or collate old facts by the scientific study of a subject

Research is divided into two general categories: (1) Basic research, which is an inquiry aimed at increasing scientific knowledge, and (2) Applied research, which is an effort aimed at using basic research for solving problems or developing new processes, products or techniques (Bhwama & Gobind, 2015: 48).

According to Kumar (2013: 22), research is undertaken within most professions and is more than a set of skills; research is a way of thinking: examining critically the various aspects of your day-to-day professional work; understanding and formulating guiding principles that govern a particular procedure; and developing and testing new theories that contribute to the advancement of your practice and profession. As reported by Ismail (2015: 2), research has also grown into an important agenda in the improvement of the economy. In addition to that, the author mentioned that the development has added a new dimension to the world of research with commercialisation aspects added on. Only through research, is it possible to make progress in a field (Bhwama & Gobind, 2015: 48). Further, the authors asserted that research is indeed

civilisation and determines the economic, social and political development of a nation. The purpose of research is to discover answers to questions through the application of scientific procedure (Pandey & Pandey, 2015: 9). In the opinion of Barua and Sinha (2015:2), the objectives of research are different for different individuals and organisations. The main objectives of research, as given by (Bhwama & Gobind, 2015: 48), are as follows:

- To discover new facts.
- To verify and test important facts.
- To analyse an event, or process, or phenomenon in order to identify the cause, and effect relationship.
- To develop new scientific tools, concepts and theories to solve and understand scientific and non-scientific problems.
- To find solutions to scientific, non-scientific and social problems.
- To overcome or solve the problems occurring in our everyday life.
- To find out the unknown facts of an event.
- To solve the unsolved and challenging problems.
- To find new things.
- To solve new or existing problems.

Although research is a process of collecting, analysing and interpreting information to answer questions, to qualify as research however, the process must have certain characteristics (Babikir, *et al.*, 2010: 10). According to Pandey & Pandey (2015:10):

- Research is directed toward the solution of a problem.
- Research requires expertise.
- Research emphasises the development of generalisations, principles, or theories that will be helpful in predicting future occurrences.
- Research is based upon observable experience or empirical evidences.
- Research demands accurate observation and description.

- Research involves gathering new data from primary ,or first-hand sources, or using existing data for a new purpose.
- Research is characterised by carefully designed procedures that apply rigorous analysis.
- Research involves the quest for answers to un-solved problems.
- Research strives to be objective and logical, applying every possible test to validate the procedures employed by the data collected and the conclusions reached.
- Research is characterised by patient and unhurried activity.
- Research is carefully recorded and collected.
- Research sometimes requires courage.

Research must, as far as possible, be controlled, precise, systematic, valid and variable, critical and empirical (this means any conclusions drawn are based upon hard evidence gathered from information collected from real life experiences or observations) (Babikir, *et al.*, 2010:10). Research is an immortal process, since the existence of society on earth; it is a journey of truth, discoveries and inventions (Pavan & Nagarekha, 2014:168). Moreover, the authors stated that with the growth of fast moving society, there is more need for research, research methods and researchers.

4.3 RESEARCH DESIGN

A research design is a master plan that specifies the methods and procedures for collecting, analysing the needed information and it also provides a framework, or plan of action, for the research (Zikmund, Babin, Carr & Griffin, 2010: 66). A research design is a procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately and economically (Kumar 2013: 95). Research designs are types of inquiries within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research study (Creswell, 2013: 295). As reported by Kumar (2013: 96), a research design has two functions: the first relates to the identification and/or development of procedures and logistical arrangements required to undertake a study, and the second emphasises the importance of quality in these procedures to ensure their validity, objectivity and accuracy. For any

investigation, the selection of an appropriate research design is crucial in enabling the researcher to arrive valid findings, comparisons and conclusions (Kumar, 2013: 41). Credible research design therefore require more than just the adoption of data collection and data analysis methods (O' Leary, 2012: 12). Furthermore, the author claimed that credible research designs requires that such methods are nested within more macro-level frameworks, or methodologies, which work in concert with methods to provide researchers with a voracious design that can stand up to the highest level of scrutiny. A faulty design results in misleading findings and is therefore tantamount to wasting human and financial resources (Kumar, 2013: 41). In addition to that, the author indicates that when selecting a research design it is important to ensure that it is valid, workable and manageable. Hence, the choice of a research design is of critical significance. **Table 4.1** provides the different types of research designs.

Table 4.1: Types of research designs

Quantitative Designs		Qualitative Designs	
Design	Focus	Design	Focus
Correlational	Explore the relationship between two or more variables through a correlational analysis. The intent is to determine if, and to what degree, the variables are related. It does not imply one causes the other.	Case study and historical	Intent is to study and understand a single situation, which could be a leader, a classroom, a process, a program or an activity. Collect a variety of material in a specific and bounded time period. This is also used for historical studies; collecting historical data to understand and learn from the past.
Causal comparative	Compare two groups with the intent of understanding the reasons or causes for the two groups being different.	Narrative	Describe the lives of individual(s) to get meaning from them.

Experimental	Test an idea, treatment or program to see if it makes a difference. There is a control group and a test group. Individuals are randomly assigned to the two groups. One group gets the treatment (test group) and the other group (control group) does not get the treatment. There is a pre and post-test for both groups in a traditional experimental design.	Grounded theory	The focus is to develop an understanding of a phenomenon or situation in order to be able to develop a theory/model for items such as factors, a form of interaction, or a process
Quasi-experimental	It is the same as experiment, in that there is a control and test group. However, current groups are used as is, rather than randomly assigning people to the two groups. Both groups receive the pre and post- test in a traditional design.	Phenomenology	Studies a human experience at an experiential level. It is about understanding the essence or meaning of the experience.
Mixed Research Designs			
<p>A mixed research design involves having both a quantitative design and qualitative design. Mixed designs is the best approach if the study requires both quantitative and qualitative designs to address the problem statement.</p> <p>Mixed design studies take significantly more time, more resources, and requires the researcher to develop expertise in qualitative analysis techniques and quantitative analysis techniques. Qualitative studies can use numbers, counts and even descriptive statistics. Using numbers does not mean the study has to be quantitative or mixed methods.</p>			

Source: Adapted from Center for Innovation in Research and Teaching (2012).

Given the information provided in **Table 4.1**, *the most suitable research design for this study was identified as the correlational design, due to the fact that the aim of this study was to firstly explore the linkage between human resource management practices and effective supply chain management by means of a conceptual model, and secondly, to determine whether a South African automotive manufacturer implements the identified human resources practices effectively, and thirdly, to establish to what extent human resources enhance supply chain*

management effectiveness. The correlational design is research in which investigators use correlational statistics to describe and measure the degree or association (or relationship) between two or more variables or sets of scores (Creswell, 2012: 338; Ingham-Broomfield, 2014: 34).

Research can be classified from three perspectives: Application, objectives, and the type of information thought (Babikir, *et al.*, 2010: 11). The authors also indicated that a research project may be classified as pure or applied research (from the perspective of application) as with most social research, or as a descriptive, correlational, explanatory or exploratory research (from the perspective of objectives), and as quantitative or qualitative (from the perspective of the type of information thought). The worldviews, the designs, and the methods, all contribute to a research approach that tends to be quantitative, qualitative, or mixed (Creswell, 2013: 48). In addition to that, typical scenarios of research can illustrate how these three elements combine into a research design. Creswell (2013: 48) defines the three different types of research approaches as follows:

- **Quantitative approach:** “Post positivist worldview, experimental design, and pre-test and post-test measures of attitudes. In this scenario, the researcher tests a theory by specifying narrow hypotheses and the collection of data to support or refute the hypotheses. An experimental design is used in which attitudes are assessed both before and after an experimental treatment. The data are (sic) collected on an instrument that measures attitudes, and the information is analysed using statistical procedures and hypothesis testing”.
- **Qualitative approach:** “Constructivist worldview, ethnographic design, and observation of behaviour. In this situation, the researcher seeks to establish the meaning of a phenomenon from the views of participants. This means identifying a culture-sharing group and studying how it develops shared patterns of behaviour over time (i.e., ethnography). One of the key elements of collecting data in this way is to observe participants’ behaviours during their engagement in activities”.

- **Mixed methods approach:** “Pragmatic worldview, collection of both quantitative and qualitative data sequentially in the design. The researcher bases the inquiry on the assumption that collecting diverse types of data best provides a more complete understanding of a research problem than either quantitative or qualitative data alone. The study begins with a broad survey in order to generalize results to a population and then, in a second phase, focuses on qualitative, open-ended interviews to collect detailed views from participants to help explain the initial quantitative survey”.

Choosing an appropriate research approach is a very significant step in research, wherefore it is crucial to select the most suitable one. **Table 4.2** creates distinctions that may be useful in choosing an approach (Creswell, 2013: 47).

Table 4.2: Types of research approaches

Tend to or typically	Qualitative approaches	Quantitative approaches	Mixed approaches
<ul style="list-style-type: none"> • Uses philosophical assumptions • Employs these strategies of inquiry 	<ul style="list-style-type: none"> • Constructivist, transformative knowledge claims • Phenomenology, grounded, grounded theory, ethnography, case study, and narrative 	<ul style="list-style-type: none"> • Postpositive knowledge • Surveys and experiments 	<ul style="list-style-type: none"> • Pragmatic knowledge claims • Sequential, concurrent, and transformative
<ul style="list-style-type: none"> • Employ these methods 	<ul style="list-style-type: none"> • Open-ended questions, emerging approaches, text or image data 	<ul style="list-style-type: none"> • Close-ended questions, predetermine approaches, numeric data 	<ul style="list-style-type: none"> • Both open and ended questions, both emerging and predetermined approaches, and both quantitative and qualitative data and analysis

<ul style="list-style-type: none"> • Use these practices of research as the researcher 	<ul style="list-style-type: none"> • Position him or herself • Collects participant meanings • Focuses on a single concept or phenomenon • Brings personal values into the study • Studies the context or setting participants • Validates the accuracy of findings • Makes interpretations of the data • Creates an agenda for change or reform • Collaborates with the participants 	<ul style="list-style-type: none"> • Tests or verifies theories or explanations • Identifies variables to study • Relates variables in questions or hypothesis • Uses standards of validity and reliability • Observes and measures data numerically • Uses unbiased approaches • Employs statistical procedures 	<ul style="list-style-type: none"> • Collects quantitative and qualitative data • Develops a rationale for mixing • Integrates the data at different stages of inquiry • Presents visual pictures of the procedures in the study • Employs the practices of both quantitative and qualitative research
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Source: Adapted from Creswell, 2013: 47.

The correlation design falls under quantitative designs. Quantitative study designs are specific, well structured, have been tested for their validity and reliability, and can be explicitly defined and recognised (Kumar, 2013: 103). Moreover, the author claimed that quantitative study designs have more clarity and distinction between designs and methods of data collection.

4.4 RESEARCH QUESTIONS

Quantitative research questions are interrogative statements that raises questions about the relationships among variables that the investigator seeks to answer (Creswell, 2013: 295). The following question reflects the essence of this study:

To what degree does a South African automotive manufacturing organisation adopt applicable human resource management practices (best practices) to facilitate the implementation of effective supply chain management?

4.5 RESEARCH OBJECTIVES

4.5.1 PRIMARY OBJECTIVE

The primary objective of this study was to establish to what degree a South African automotive manufacturer implements effective (previously established) human resource management practices to facilitate the implementation of effective supply chain management.

4.5.2 SECONDARY OBJECTIVES

The secondary objectives were:

- To determine whether *selection practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *evaluation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *training practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *compensation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.

- To determine whether *communication practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *socialisation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To identify which human resource practices *hinder* the implementation of effective supply chain management in the South African automotive manufacturing organisation.
- To determine whether differences exist between the categories of the following demographic variables (*marital status, gender, functional areas employed, management level and education*) with regards to each of the HRM practices and the SCM importance.

4.6 PROBLEM STATEMENT

Various previous studies have provided conceptual and empirical evidence of the need for suitable and skilled human resources in supply chain management (refer to section 1.3). Although the lack of enough suitable and skilled human resources is caused by many factors beyond the control of individual organisations, they may improve the situation by focusing on effective human resource practices for the appointment of suitable personnel, upskilling, development and retention of personnel in the internal supply chain. However, limited academic studies have been conducted in South Africa on the pertinence of human resource practices in supply chain management in the manufacturing environment.

With the above as background, the problem statement of this study was:

To what degree is a South African automotive manufacturing organisation adopting applicable human resource management practices to facilitate the implementation of effective supply chain management?

4.7 HYPOTHESIS

As reported by Kumar (2013: 86), one important consideration in the formulation of a research problem in quantitative research, is the construction of a hypothesis. A hypothesis is a formal statement explaining some outcome (Zikmund, *et al.*, 2010: 42). A hypothesis is an uncertain or a tentative statement that is subjected to verification through a research study (Babikir, *et al.*, 2010: 15). Quantitative hypotheses are predictions the researcher makes about the expected relationships among variables (Creswell, 2013: 295). According to Kumar (2013: 87), the importance of hypotheses lies in their ability to bring direction, specificity and focus to a research study. In addition to that, the author mentioned that a hypothesis tells the researcher what specific information to collect, and thereby provides greater focus.

Based on the conceptual model provided in chapter one, the study proposed (refer to section 1.8.1.1) the following hypotheses:

- H.1** Human resources selection practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.
- H.2** Human resources evaluation practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.
- H.3** Human resources training and development practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.

- H.4** Human resources compensation practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.
- H.5** Human resources communication practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.
- H.6** Human resources socialisation practices have a positive effect on supply chain management effectiveness in the South African automotive manufacturer.
- H.7** Six determinants of human management of management practices have a significant positive effect on supply chain management effectiveness in the South African automotive manufacturer.

In this study, it was hypothesised that human resource management practices have a significant positive effect on supply chain management effectiveness.

4.8 THE METHODOLOGICAL APPROACH ADOPTED FOR THIS STUDY

Research approaches are the plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis, which involves the intersection of philosophical assumptions, designs, and specific methods (Creswell, 2013: 295). As stated by Theo (2013: 31), the selection of a research approach is also based on the nature of the research problem or issue being addressed, the researcher's personal experiences, and the audiences for the study.

4.8.1 RESEARCH METHODS SELECTED FOR THIS STUDY: QUANTITATIVE RESEARCH

For satisfying the objectives of this study, and given the nature of this study, a quantitative approach was selected. As asserted by Ismail (2015: 3), quantitative research approaches have roots in 20th century philosophical thinking. The word quantitative implies quantity or amounts (Ingham-Broomfield, 2014: 33). ‘Quantitative’ roughly means in terms of ‘quantities’ implying the extent to which something either does, or does not, occur in terms of amount, number, frequency, etc. (Jonker & Pennink, 2010: 65). Quantitative research uses numbers for three basic purposes: naming and counting, ranking, and placing on a scale (Brigham, 2010: 6). The essence of quantitative research is to use a ‘theory’ to frame, and thus understand, the problem at hand (Jonker & Pennink, 2010: 65). Quantitative research is often regarded as being purely scientific, justifiable, precise and based on facts often reflected in exact figures (Jonker. & Pennink, 2010: 39).

The quantitative research is subjected to statistical analysis, it relies mainly on primary data, like the survey method and questionnaire method, and one can observe the inter-dependence between one another (Pavan & Nagarekha, 2014: 170). Another feature of quantitative research is hypothesis testing (Ismail, 2015: 5). Quantitative research is an approach for testing objective theories by examining the relationship among variables (Creswell, 2013: 32; Yilmaz, 2013: 312). Quantitative research is the systematic empirical investigation of observable phenomena via statistical, mathematical or computational techniques with the objective of developing and employing mathematical models, theories and/or hypotheses pertaining to phenomena (Bhwama & Gobind, 2015: 49; Jonker & Pennink, 2010:66). The quantitative research approach is based upon an empirical cycle that has a deductive nature (Jonker & Pennink, 2010: 66). **Table 4.3** presents the advantages and limitations of quantitative methods.

Table 4.3: Advantages and limitations of the quantitative method

Advantages of quantitative method	Limitations of quantitative method
<ul style="list-style-type: none"> Well-known methodology. This is the most popular method of collecting data. The entire process is structured. The process can be planned. 	<ul style="list-style-type: none"> Its structured approach gives this method less flexibility. The method solely depends on a researcher’s understanding of the topic. If the researcher

<ul style="list-style-type: none"> • The process is independent of the researcher. • The analysis uses standard methods/software. • Some partsof the process can be outsourced, hence, the researcher's involvement can be minimised. • Since all the respondents are asked the same set of questions, the quantitative analysis of the data is possible. The general approach to statistical analysis is to find similarities and differences between the subsets of answers. • Quantitative research techniques are very well suited to the specific purposes for which they were developed. • The development of quantitative research techniques and tools of analysis has encouraged the expression of the kinds of questions that yield to the logic of counting and measuring, the core of quantitative research, rather than logic of describing and searching for meaning, and the core of qualitative research (admittedly oversimplifications of each research tradition). • Provide large representative samples of cultural communities. • Reliably asserts cause-and-effect relationships among constructs as well as confirm or disconfirm theoretical hypotheses. • Summarises numerical data in ways that are clear and persuasive to leaders and policy-makers. • In quantitative research, enough detail about a study design is provided for it to be replicated for verification and reassurance. • Traditionally, quantitative research has been characterised by its concern for objective data collection, emphasis on researcher control, 	<p>does not have an adequate understanding of the issue/problem, the method might not deliver valid results.</p> <ul style="list-style-type: none"> • Only written responses are considered, the unwritten responses like body language, the tone of talking, etc. are not considered in this method. • Self-reported information obtained from questionnaires may be inaccurate or incomplete. • There is often no information on contextual factors to help interpret the results, or to explain variations in behaviour between households with similar economic and demographic characteristics. • The administration of a structured questionnaire creates an unnatural situation that may alienate respondents. • Studies are expensive and time-consuming, and even the preliminary results are usually not available for a long period. • Research methods are inflexible because the instruments cannot be modified once the study begins. • Reduction of data to numbers results in lost information. • The correlations produced (e.g., between costs and benefits, gender, and access to services or benefits) may mask or ignore underlying causes or realities. • Untested variables may account for program impacts. • Errors in the hypotheses tested may yield misimpressions of program quality or influential factors.
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and development of systematic and standardised procedures. <ul style="list-style-type: none"> Standardized approaches permit the study to be replicated in different areas or over time with the production of comparable findings. 	<ul style="list-style-type: none"> Errors in the selection of procedures for determining statistical significance can result in erroneous findings regarding impact.
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Source: Adapted from Barua & Sinha (2015: 50); Brigham (2010: 3); Fassinger & Morrow (2013: 15); Kumar (2013: 104); Kelemen & Rumens (2012: 5); InterAction (2017).

The research in this study was conducted in two plants of a single automotive manufacturer. Accordingly, a case study approach was followed. Case studies simply refer to the documented history of a particular person, group, organisation, or event (Zikmund, *et al.*, 2010: 140). The case study design is based upon the assumption that the case being studied is typical of cases of a certain type, and therefore, a single case can provide insight into the events and situations prevalent in a group from where the case was drawn (Kumar, 2013: 123). Further, the author specified that the case study, though dominantly a qualitative study design, is also prevalent in quantitative research. In addition, in a case study design, the ‘case’ which the researcher selects becomes the basis of a thorough, holistic and in-depth exploration of the aspect(s) that the researcher wants to explore. A primary advantage of the case study is that an entire organisation or entity can be investigated in depth with meticulous attention to detail (Zikmund, *et al.*, 2010: 140). In addition to that, the authors mentioned that this highly focused attention enables the researcher to carefully study the order of events as they occur, or to concentrate on identifying the relationships among functions, individuals, or entities. *The organisation selected for this case study was a South African automotive manufacturer.*

It is crucial to point out that the findings of this study succeed in making contribution to the body of knowledge with regard to the important role that effective human resource management plays to improve supply chain performance in the South African automotive industry.

4.8.2 POPULATION AND METHODS OF COLLECTING SURVEY DATA

This section deals with matters concerning the actual population and methods of collecting survey data for this particular study.

The population is also called universe (Pandey & Pandey, 2015: 106). In addition to this, the authors also indicated that the salient characteristics of the population should be thoroughly described. The need for appropriate participants becomes more apparent with tools that are designed for specific populations (Lazar, Feng, & Hochheiser, 2010: 370). As stated in section 1.9.1, the researcher initially planned to include various manufacturing organisations in South Africa in the study. However, the difficulty of finding a comprehensive and up-to-date list of manufacturers, and the expected low rate of response to this kind of survey, as well as the scope of the study, necessitated the researcher to search for and liaise with one large manufacturing organisation which was willing to participate in the study. One leading automotive manufacturing organisation finally agreed to take part in the study. The aforementioned automotive manufacturing organisation represented the target population for this current study.

According to the Australian Bureau of Statistics (2013), a population may be studied using one of two approaches: taking a census, or selecting a sample. In addition to that, it is important to note whether a census or a sample is used; both provide information that can be used to draw conclusions about the whole population. Census refers to the quantitative research method, in which all the members of the population are enumerated (Surbhi, 2016). On the other hand, sampling is a widely used method in statistical testing, wherein a data set is selected from a large population which represents an entire group.

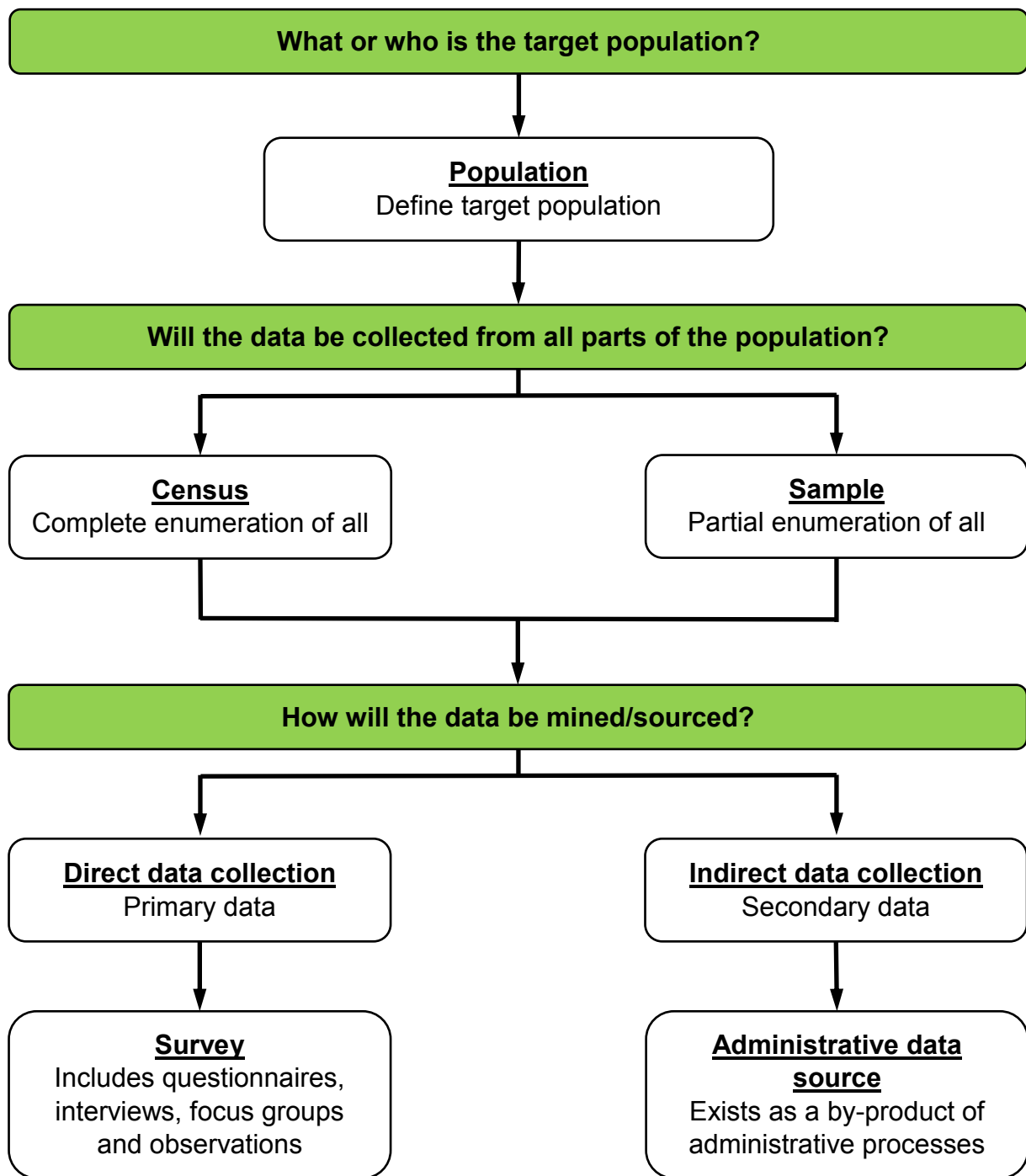


Figure 4.2: Collecting data about a population flowchart

Source: Australian Bureau of Statistics (2013)

Once a population has been identified, a decision needs to be made about whether taking a census or selecting a sample will be the more suitable option (Australian Bureau of Statistics, 2013).

Table 4.4 exhibits the comparisons between a census and a sample.

Table 4.4: Comparison chart between census and a sample

Basis for Comparison	Census	Sampling
Meaning	A systematic method that collects and records the data about the members of the population is called Census.	Sampling refers to a portion of the population selected to represent the entire group, in all its characteristics.
Enumeration	Complete.	Partial.
Study of	Each unit of the population.	Only a handful of units of the population.
Time required	It is a time consuming process.	It is a fast process.
Cost	Expensive method	Economical method.
Results	Reliable and accurate	Less reliable and accurate, due to the margin of error in the data collected.
Errors	Not present.	Depends on the size of the population.
Appropriate for	Population of heterogeneous nature.	Population of homogeneous nature.

Source: Surbhi (2016).

Table 4.5 displays the advantages and disadvantages of using a census to study a population.

Table 4.5: Advantages and disadvantages of using a census to study a population

Advantages of a census	Disadvantages of a census
<ul style="list-style-type: none">• Provides a true measure of the population (no sampling error).• Benchmark data may be obtained for future studies.• Detailed information about small sub-groups within the population is more likely to be available.	<ul style="list-style-type: none">• May be difficult to enumerate all units of the population within the available time.• Higher costs, both in staff and monetary terms, than for a sample.• Generally takes longer to collect, process, and release data than from a sample.

Source: Australian Bureau of Statistics (2013)

Table 4.6 shows the advantages and the disadvantages of a sample.

Table 4.6: Advantages and disadvantages of a sample

Advantages of a sample	Disadvantages of a sample
<ul style="list-style-type: none">• Costs would generally be lower than for a census.• Results may be available in less time.• If good sampling techniques are used, the results can be a very good representation of the actual population.	<ul style="list-style-type: none">• Data may not be representative of the total population, particularly where the sample size is small.• Often not suitable for producing benchmark data.• As data is collected from a subset of units and inferences made about the whole population, the data is subject to 'sampling' error.• Decreased number of units will reduce the detailed information available about sub-groups within a population.

Source: Australian Bureau of Statistics (2013)

It is quite clear that these two options of census vs sample are different, but it cannot be said that one is above the other (Surbhi, 2016). Sample and census surveys both provide value, and when implemented properly, produce valid results (Sofres, 2016). The decision of whether to conduct a census or a sample survey is based on numerous factors, including: the budget and resources available, the size of the population and subpopulations of interest, and the timeliness of the survey

results (Statistics Canada, 2010). Therefore, based on the population size, this study made use of a census. The census method is also called a complete enumeration survey method, wherein each item in the universe is selected for the data collection (Business Jargons, 2016) as exhibited in **figure 4.2** and in **table 4.4**. Furthermore, the universe might constitute a particular place, a group of people, or any specific locality which is the complete set of items, and which are of interest in any particular situation. *The population of this study was the people working in the supply chain* (supply chain managers, line managers in supply chain functions, operation level purchasing staff, transportation/logistics staff, distribution staff, inventory/warehousing staff, quality controller, production staff and schedulers) *of the two plants of the organisation*. The total staff complement working in the supply chain of this organisation amounts to 110 people.

4.8.3 VARIABLES IN QUANTITATIVE RESEARCH

A variable is an image, perception or concept that is capable of measurement; hence capable of taking on different values, (Kumar, 2013: 71) and to which a researcher assigns categorical values (Barua & Sinha, 2015: 8), in other words, a concept that can be measured is called a variable. A variable is also defined as anything that varies or changes from one instance to another (Zikmund, *et al.*, 2010: 119). Withal, the authors reported that variables can exhibit differences in value, usually in magnitude or strength, or in direction. In research, a variable is either observed or manipulated, in which case it is an experimental variable. According to Creswell (2013: 84), variables are distinguished by two characteristics: (a) temporal order, and (b) their measurement (or observation). Below are the different types of variables in research as given by Barua and Sinha (2015: 8):

- **Independent variable; (IV) (predictor variable):** The variable manipulated by the researcher, thereby causing an effect on the dependent variable.
- **Dependent variable; (DV) (criterion variable):** A measured, predicted, or otherwise monitored variable expected to be affected by manipulation of an independent variable.

- **Moderating variable (MV):** A second independent variable, believed to have a significant contribution or contingent effect of the originally stated IV-DV relationship.
- **Extraneous variable (EV):** A variable to assume or exclude from a research study.
- **Control variable:** A variable introduced to help interpret the relationship between variables.
- **Intervening variable (IVV):** A factor that affects the observed phenomenon but cannot be measured or manipulated.

The process of identifying the relevant variables overlaps with the process of determining the research objectives (Zikmund, *et al.*, 2010: 120). Furthermore, the authors specified that typically, each research objective will mention a variable or variables to be measured or analysed. In a quantitative research study, variables are related to answer a research question (Creswell, 2013: 85). Hence, based on the research objectives given in section 4.5, *the two major constructs for this study were: effective supply chain management practices as dependent variable and human resource management practices including: selection, evaluation, training, compensation, communication and socialisation as independent variables.*

4.8.4 SURVEY METHOD

The survey is the most popular method for quantitative research (Barua & Sinha, 2015: 50). Because most survey research is descriptive research, the term survey is most often associated with quantitative findings (Zikmund, *et al.*, 2010: 186). Moreover, the authors stated that although most surveys are conducted to quantify certain information, some aspects of surveys might also be qualitative. Survey is a popular method to collect data on a large scale (Barua & Sinha, 2015: 51). Further, the authors mentioned that a survey is a method for collecting quantitative information about items in a population and the information is collected either using human intervention, via a

highly structured interviews, or without human intervention. A survey can be administered using the following methods (Barua & Sinha, 2015: 51):

- Personally
- Telephonic
- Mail
- Electronic media

Surveys provide a quick, inexpensive, efficient, and accurate means of assessing information about a population (Zikmund, *et al.*, 2010: 186). Withal, the authors indicated that often, research entails asking people (called respondents) to provide answers to written or spoken questions. Primary data can be collected either through experiment or through survey; in case of survey, data can be collected by any one or more of the following ways (Pandey & Pandey, 2015: 15; O' Leary, 2012: 12; Babikir, *et al.*, 2010: 19):

- By observation
- Through personal interviews
- Through telephonic interviews
- By mailing of questionnaires
- Through schedules

Table 4.7: Characteristics of typical survey methods

	Door to door personal interview	Mail intercept personal interview	Telephone interview	Mail survey	Internet survey
Speed of data collection	Moderate to fast	Fast	Very fast	Slow, researcher has no control over return of questionnaire	Instantaneous, 24/7

Geographic flexibility	Limited to moderate	Confined, possible urban bias	High	High	High (worldwide)
Respondent cooperation	Excellent	Moderate to low	Good	Moderate, poorly designed questionnaire will have low response rate	Varies depending on Web site; high from consumer panels
Versatility of questioning	Quite versatile	Extremely Versatile	Moderate	Not versatile; requires highly standardized format	Extremely Versatile
Questionnaire length	Long	Moderate to Long	Moderate	Varies depending on incentive	Moderate, length customized based on answers
Item nonresponse rate	Low	Medium	Medium	High	Software can assure none
Possibility for respondent misunderstanding	Low	Low	Average	High, no interviewer present for clarification	High
Degree of interviewer's influence on answers	High	High	Moderate	None, interviewer absent	None
Supervision of interviewers	Moderate	Moderate to high	High, especially with central location interviewing	Not applicable	Not applicable
Anonymity of respondent	Low	Low	Moderate	High	Respondent can be either anonymous or known

Ease of call-back or follow-up	Difficult	Difficult	Easy	Easy, but takes time	Difficult, unless e-mail address is known
Cost	Highest	Moderate to High	Low to moderate	Lowest	Low
Special features	Visual materials may be shown or demonstrated; extended probing possible	Taste tests, viewing of TV commercials possible	Fieldwork and supervision of data collection are simplified; quite adaptable to computer technology	Respondent may answer questions at own convenience; has time to reflect on answers	Streaming media software allows use of graphics and animation

Source: Adapted from Zikmund, *et al.* (2010: 232)

4.8.5 RESEARCH INSTRUMENT

Anything that becomes a means of collecting information for a study is called a ‘research tool’ or a ‘research instrument’ and the construction of a research instrument is the first ‘practical’ step in carrying out a study (Kumar, 2013: 41). Quantitative methods require the researcher to use a pre-constructed, standardised instrument, or pre-determined response categories into which the participants’ varying perspectives and experiences are expected to fit (Yilmaz, 2013: 313). Quantitative instruments may include self-reporting tools, questionnaires, observations, and biophysical measures (Polit & Hungler, 2013). In this study, it was planned to determine the application of human resource management practices in supply chain management, in a South African automotive manufacturing organisation by means of a research instrument (questionnaire), developed through inputs from the literature study and particularly studies by Khan, *et al.* (2013) and Chew (2004: 242-248). Thus, there was a degree of overlapping between the questionnaire of this study and those of Chew and Khan.

The method of collecting data in vast geographical areas is done through a questionnaire method (Pavan & Nagarekha, 2014: 171). In addition to that, the authors stated that since questionnaires

are mailed to the research areas and distributed among the respondents, it is a time saving and economical method, but the main drawback is that the answers given by the respondents are not always accurate. A questionnaire is a written list of questions: the respondents read the questions, interpret what is expected, and then write down (record) the answers (Kumar, 2013: 138). Quantitative research is initialised by means of a closed question that results in a problem definition appearing at the start of the research. The elaboration of the question is based on a relevant amalgam of existing theories (Jonker & Pennink, 2010: 66). The results of closed-ended questionnaires help the researchers to identify a general pattern of participants' reactions to a treatment or programme (Yilmaz, 2013: 313).

Thus, the author suggested that quantitative researchers are supposed to play a neutral role in the research process. Questionnaires can be printed on paper, but they may be posted on the internet or sent via e-mail (Zikmund, *et al.*, 2010: 219). Further, the authors pointed out that it's the manner in which the self-administered questionnaires are distributed is irrelevant, they are different from interviews because the respondent takes responsibility for reading and answering the questions.

This study used quantitative questionnaires, a combination of web-based questionnaires (survey monkey) and paper-based questionnaires.

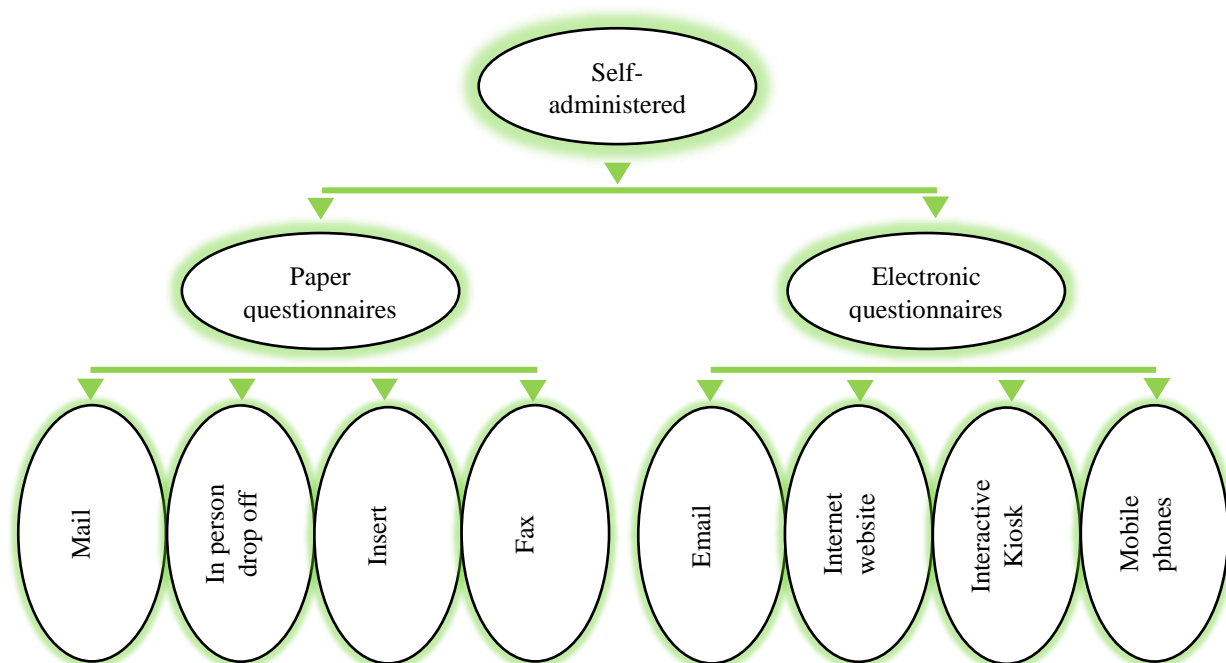


Figure 4.3: Self-administered questionnaires

Source: Zikmund, *et al.* (2010: 219)

4.8.5.1 Pretesting the research instrument

Having constructed a research instrument, whether an interview schedule or a questionnaire, it is important that the researcher tests it before using it for actual data collection (Kumar, 2013: 150). Withal, the authors indicated that pre-testing a research instrument entails a critical examination of the understanding of each question and its meaning as understood by a respondent, and that a pre-test should be carried out under actual field conditions on a group of people similar to the researcher's study population. A pilot study is a small-scale research project that collects data from respondents similar to those that will be used in the full study (Zikmund, *et al.*, 2010: 65) for the purpose of assessing the adequacy and feasibility of the intended research (Moxham, 2012: 35). Pilot testing is intended to reveal errors in the design and improper control of extraneous, or environmental, conditions by permitting refinement before the final test (Barua & Sinha, 2015: 43). It can serve as a guide for a larger study, or examine specific aspects of the research to see if the selected procedures will actually work as intended (Zikmund, *et al.*, 2010: 35; Leon, Davis & Kraemer, 2011: 626). By doing so, the researcher can identify problems and strengthen the quantitative methodology (Ingham-Broomfield, 2014: 35). Pilot testing is essential to check questionnaire items and language used in the items (Ullah & Yasmin, 2013: 12). Pilot studies are also often useful in fine-tuning research objectives (Zikmund, *et al.*, 2010: 35). As indicated in chapter 1, *a pilot testing will be undertaken in this study.*

4.8.5.2 Measurement scale for this study

As indicated in section 4.8.5, a questionnaire is a written list of questions (Kumar, 2013: 138). The questionnaire that was used to collect primary data for this study was divided into the following sections:

- Section A investigated how supply chain employees perceive the human resource practices within their organisation.

- Section B explored how supply chain employees perceive the importance of certain concerns to their organisation's supply chain management efforts.
- Section C consisted of the background information of the supply chain employees.

According to Stat Trek (2011), each scale of measurement satisfies one or more of the following properties of measurement:

- **Identity:** Each value on the measurement scale has a unique meaning.
- **Magnitude:** Values on the measurement scale have an ordered relationship to one another. That is, some values are larger and some are smaller.
- **Equal intervals:** Scale units along the scale are equal to one another. This means, for example, that the difference between 1 and 2 would be equal to the difference between 19 and 20.
- **A minimum value of zero:** The scale has a true zero point, below which no values exist.

Based on Managing with Measures (2012), in 1946, Stanley Smith Stevens of Harvard University published a brief article in the journal *Science* that classified measurement scales into four types, and since that time, his classification has been used by statisticians, researchers, academics, and quantitative analysts of all sorts. Stevens's classification identifies four types of measurement scales:

Nominal scale: "Each value on the scale is a label that represents a category of characteristics. Values on a nominal scale have no inherent order and do not represent quantities on a continuum."

Ordinal scale: “Each value on the scale represents a quantity of a characteristic by a rating. The values on an ordinal scale have an inherent order (from low to high or less to more), but the intervals between values are not equal because an ordinal scale lacks a ‘unit of measure’.”

Interval scale: “Each value on the scale represents a precise quantity of the characteristics being measured. An interval scale incorporates a unit of measure to indicate quantities. An interval scale is similar to a ratio scale except that an interval scale does not have an absolute zero.”

Ratio scale: “Like an interval scale, each value on a ratio scale represents a precise quantity based on a unit of measure. Unlike an interval scale, a ratio scale has a true zero value that represents the absence of quantity.”

This study made use of an ordinal scale. A method that is simple to administer and therefore extremely popular is the adaptation of the method of summated ratings by ratings business researchers, developed by Rensis Likert (Zikmund, *et al.*, 2010: 318; Barua & Sinha, 2015: 76). With this, the ‘Likert scale’, respondents indicate their attitudes by checking how strongly they agree or disagree with carefully constructed statements, ranging from very positive to very negative attitudes toward some object, and individuals generally choose from approximately five response alternatives: strongly agree, agree, uncertain, disagree, and strongly disagree, although the number of alternatives may range from three to nine (Zikmund, *et al.*, 2010: 318).

The questionnaire of this study comprised of three parts. The first part consisted of human resource management practices. Selection consisted of three items, evaluation of three items, training of two items, and compensation of two items. The questionnaire also included communication which comprised of three items and lastly, socialisation which comprised four items. The respondents were given different statements and asked to indicate their degree of agreement using a five point Likert type response format ranging from 1= “Strongly disagree” to 5= “Strongly agree”. The second part of the questionnaire consisted of a number of the organisation’s supply chain management practices. The construct consisted of five items which were used to measure the

supply chain management effectiveness. The respondents were given different statements and asked to indicate the degree of importance attached to the practices of the organisation's supply chain management, using a five point Likert type response format ranging from 1= "Not important at all" to 5= "Extremely important". The third part of the questionnaire consisted of the demographic profile of the respondents.

If the researcher is planning to analyse his/her data by computer, they will need to be coded prior to entry (Saunders, Lewis & Thornhill, 2009: 385). All data types should, with few exceptions, be recorded using numerical codes. This enables the researcher to enter the data quickly using the numeric keypad on his/her keyboard and with fewer errors (Field, 2009: 422). Each variable for each case in the researcher's data set should have a code, even if no data was collected (Field, 2009: 425) and then stored in a data file (Zikmund, *et al.*, 2010:478). **Table 4.8, 4.9, 4.10 and 4.11** summarise the ratings and their respective codes.

Table 4.8: Ratings and their respective codes (agreement)

Rating	Code
Strongly disagree	1
Disagree	2
Neither agree nor disagree	3
Agree	4
Strongly agree	5

Table 4.9: Ratings and their respective codes (importance)

Rating	Code
Of no importance	1
Of minor importance	2
Of moderate importance	3
Of larger/higher importance	4
Of extreme importance	5

Table 4.10: Ratings and their respective codes (demographics)

Age	Code	Highest level of education	Code	Marital status	Code	Total years of experience	Code
20-25 years	1	Matric/ Gr12	1	Married/Living together with a partner	2	Less than a year	
26-30 years	2	Tertiary diploma/ certificate	2	Single	1	1-3 years	1
31-35 years	3	Bachelor degree	3			6 years	2
36-40 years	4	Honors degree	4	Gender		7-9 years	3
41-45 years	5	Master's degree	5	Male	1	10-12 years	4
46-50 years	6	Doctorate	6	Female	2	13-15 years	5
Over 50 years	7	Other (Please specify)	7			Over 15 years	6

Table 4.11: Ratings and their respective codes (position/level)

Functional area	Code	Management Level	Code
General Management	1	Junior	1
Marketing / Sales / Services	2	Middle	2
Operation level purchasing staff/ Operations / Engineering / Technical	3	Senior	3
Supply chain managers/ Line managers/ Accounts / Finance	4	Executive	4
Purchasing/ Procurement/ Stores	5	Non-manager	5

Source: Compiled by the researcher and statistician (2018)

4.8.6 DATA COLLECTION

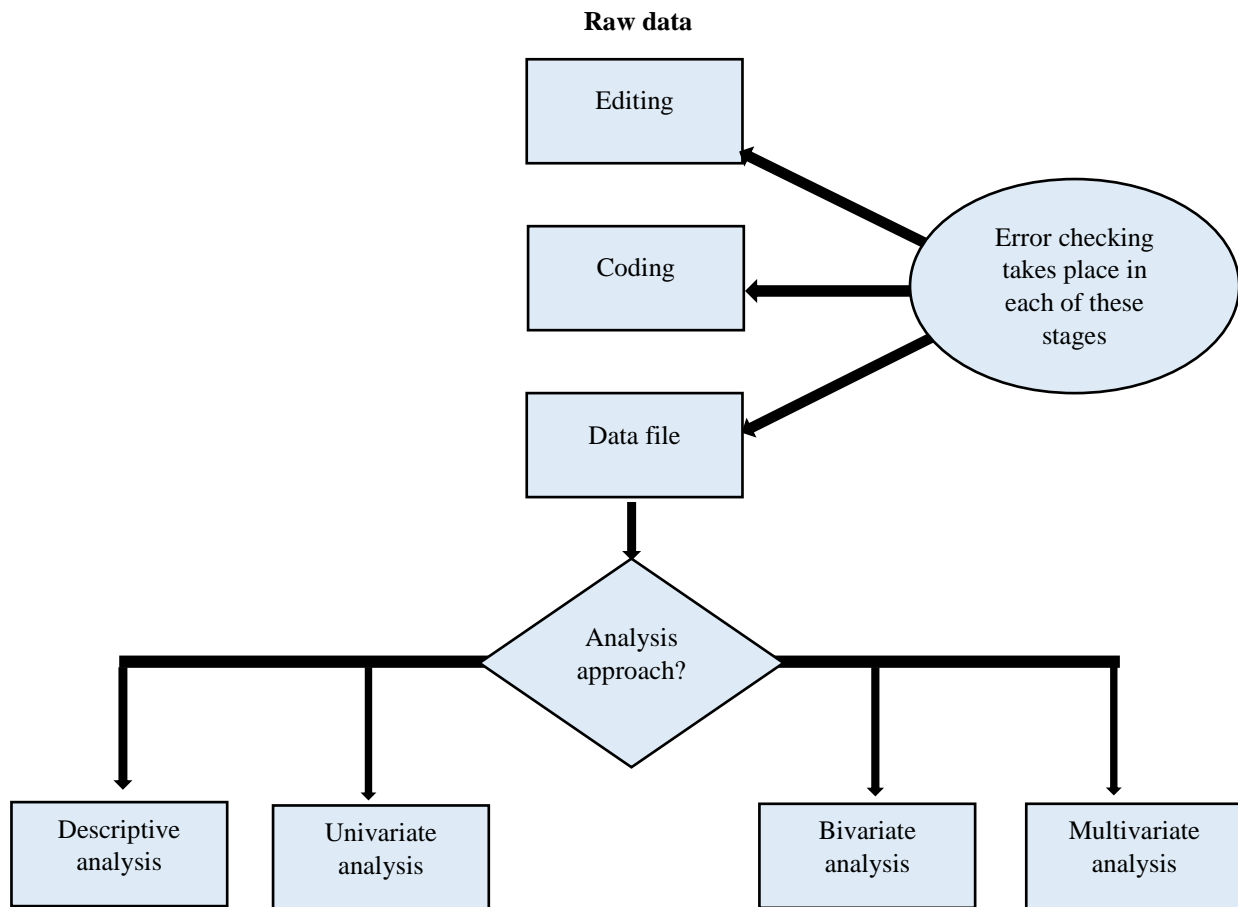
There are several ways of collecting the appropriate data which differ considerably in terms of cost, time and other resources at the disposal of the researcher (Pandey & Pandey, 2015: 15). Choosing appropriate data collection methods is important for producing useful data to inform the issues under investigation (Wu & Patel, 2014: 97). The method of gathering or collecting the data is planned in data collection design (Pavan & Nagarekha, 2014: 171). Withal, the authors claimed that there are many types for collecting the data: the two types of collecting data, are primary data and secondary data. The quantitative research helps to quantify data which is collected in quantities (numerical manner) and in controlled research; the researcher is interested in exploring causality in relation to two variables, therefore, the study must be set up in a way that minimises the effects of multiplicity of relationships and interacting factors affecting the outcome (Babikir, *et al.*, 2010: 12). *This study collected data by means of a web-based questionnaire (monkey survey) and paper-based questionnaires. The questionnaire, together with an introduction letter explaining the study's intent, was emailed or handed to the employees selected for the sample.* The benefits of incorporating a questionnaire in an e-mail includes the speed of distribution, lower distribution and processing costs, faster turnaround time, more flexibility, and less handling of paper questionnaires (Zikmund, *et al.*, 2010: 227). After responses from the first wave of mailings begin to trickle in, most studies use a follow-up letter or postcard reminder, which requests the questionnaire to be returned since a 100% return rate is important (Zikmund, *et al.*, 2010: 223). Furthermore, the authors stated that multiple contacts almost always increase response rates. The more contacts made to reach people, the greater the chances of their responding. The second follow-up email was sent to those who had not responded after two weeks. The follow-up email included the link to participate in the anonymous web-based survey. *Hard copy questionnaires were provided to close-by participants, some of which do not have external email addresses.* A third follow-up via email was sent a week after to those respondents who had not yet participated in the online survey, and calls were made to those who have not yet completed the paper-based questionnaire. After the closing date, a final follow-up was conducted: those respondents who had not yet completed the online survey or the paper questionnaire were again contacted in an attempt to improve the response rate. Once the researcher was of the opinion that no additional response

would be received from the population, the respondents were thanked for their time and willingness to participate in the survey.

4.8.7 DATA ANALYSIS AND HYPOTHESIS TESTING

The final stage of the research process is to analyse the data the researcher collected (Field, 2009: 18). Data analysis is the application of reasoning to understand the data that has been gathered: in its simplest form, analysis may involve determining consistent patterns and summarising the relevant details revealed in the investigation (Zikmund, *et al.*, 2010: 70). The analysis of data requires a number of closely related operations, such as: establishment of categories, the application of these categories to raw data through coding, tabulation, and then drawing statistical inference (Pandey & Pandey, 2015: 15). The appropriate analytical technique for data analysis will be determined by management's information requirements, the characteristics of the research design, and the nature of the data gathered (Zikmund, *et al.*, 2010: 70). Proper design of data analysis procedures increases the rigor and validity of data interpretation (Wu & Patel, 2015: 97). Further, the authors indicated that all three elements are interrelated and influence one another, with the common objective of answering the research question. Data analysis embraces a whole range of activities of both the qualitative and quantitative type, and it is a usual tendency in behavioural research that much use of quantitative analysis is made and statistical methods and techniques are employed (Lazar, *et al.*, 2010: 70).

Figure 4.4 illustrates the overview of the stages of data analysis.



Source: Zikmund, *et al.* (2010: 463).

Figure 4.4: Overview of the stages of data analysis

Quantitative data in a raw form, that is, before the data is processed and analysed, convey very little meaning to most people (Saunders, *et al.*, 2009: 414). The data, therefore, needs to be processed to make same useful, that is, to turn it into useful information. When the data is quantitative, this involves looking at the data graphically, to see what the general trends in the data are, as well as fitting statistical models to the data (Field, 2009: 18). The distinctions between quantitative and qualitative data are helpful in terms of understanding what is necessary in order to be able to analyse the data meaningfully (Saunders, *et al.*, 2009: 482). **Table 4.12** provides distinctions between quantitative and qualitative data.

Table 4.12: Distinctions between quantitative and qualitative data

Quantitative data	Qualitative data
<ul style="list-style-type: none">• Based on meanings derived from numbers• Collection results in numerical and standard data• Analysis conducted through the use of diagrams and statistics	<ul style="list-style-type: none">• Based on meanings expressed through words• Collection results in non-standardised data requiring classification into categories• Analysis conducted through the use of conceptualisation

The findings need to be analysed, and in the case of quantitative research, statistical analysis and interpretation is an essential part of answering the hypothesis or research questions (Borbasi & Jackson, 2012: 114). The statistical methods and techniques have a special position in research because they provide answers to the problems (Lazar, *et al.*, 2010: 70). To analyse variables statistically, they have to be in a measurable form, that means, using numbers or scores (Borbasi & Jackson, 2012: 115). *A statistical analysis was used to analyse the data which was collected from questionnaires.*

By taking into account that *this study tested significant relationships and differences*, a summary of statistics to examine relationships, differences and trends by data type is provided in **table 4.13**.

Table 4.13: Statistics to examine relationships, differences and trends by data type: a summary

	Categorical		Numerical	
	Descriptive	Ranked	Continuous	Discrete
To test whether two variables are Associated	Chi square (data may need grouping)		Chi square if variable grouped into discrete classes	
	Cramer's V Phi (both variables must be dichotomous)			
To test whether two groups (categories) are different		Kolmogorov-Smirnov (data may need grouping) or Mann-Whitney <i>U</i> test	Independent <i>t</i> -test or paired <i>t</i> -test (often used to test for changes over time) or Mann-Whitney <i>U</i> test (where data is skewed or a small sample)	
To test whether three or more groups (categories) are different			Analysis of variance (ANOVA)	
To assess the strength of the relationship between two variables		Spearman's rank correlation coefficient (Spearman's rho) or Kendall's rank order correlation coefficient (Kendall's tau)	Pearson's product moment correlation coefficient (PMCC)	
To assess the strength of the relationship between one dependent and one independent variable			Coefficient of determination (regression coefficient)	

To assess the strength of the relationship between one dependent and two or more independent variables		Coefficient of multiple determination (multiple regression coefficient)
To predict the value of a dependent variable from one or more independent variables		Regression equation (regression analysis)
To examine relative change (trend) overtime		Index numbers
To compare relative changes (trends)over time		Index numbers
To determine the trend over time of a series of data		Time series: moving averages or regression equation (regression analysis)

Source: Saunders, *et al.* 2008.

During the process of analysis, relationships of differences supporting or conflicting with original or new hypothesis should be subjected to tests of significance to determine with what validity data can be said to indicate any conclusions (Pandey & Pandey, 2015: 15). Hypothesis testing will result in either accepting the hypothesis or in rejecting it (Pandey & Pandey, 2015: 16). The testing of the hypothesis becomes meaningless if any one of the aspects of the study (design, sampling procedure, method of data collection, analysis of data, statistical procedures applied or conclusion drawn) is faulty or inappropriate, as this can result in erroneous verification of a hypothesis (Babikir, *et al.*, 2010: 15). The findings of a quantitative study are analysed by means of statistical analysis and an interpretation is an essential part of answering the hypothesis or research questions (Borbasi & Jackson, 2012: 269). *In this study, the findings were statistically analysed and interpretations made.*

4.9 VALIDITY AND RELIABILITY OF THE STUDY

This section discusses, in more details, the reliability and the validity of the study. For a questionnaire to fulfil a researcher's purposes, the questions must meet the basic criteria of relevance and accuracy (Zikmund, *et al.*, 2010: 336).

4.9.1 VALIDITY OF THE STUDY

According to Kumar (2013: 165), broadly this concept of appropriateness and accuracy as applied to a research process is called validity. A test is considered valid if it measures what it claims to be measuring (Theo, 2013: 23). Inaccuracies can be introduced into a study at any stage, the concept of validity can be applied to the research process as a whole or to any of its steps: study design, sampling strategy, conclusions drawn, the statistical procedures applied or the measurement procedures used (Kumar, 2013: 165). In addition to that, broadly, there are two perspectives on validity based on:

1. Does the research investigation provide answers to the research questions in line with the aim and the objectives of the study?

2. If so, does it provide these answers using appropriate methods and procedures?

Test validity can be better understood from the causal inference perspective: for the test to be perfectly valid, the degree of the construct (or presence or absence of it) should be the only cause for the observed responses, but this we know to be unattainable (Theo, 2013: 23). Further, the author stated that this also implies that solely statistical procedures will hardly ensure validity correlations, and other forms of statistical evidence will provide only a partial support for test validity. Further, that without a careful validation procedure, no amount of statistical methodology can provide the jump from correlation to causation. Validity in quantitative research refers to whether one can draw meaningful and useful inferences from scores on particular instruments (Creswell, 2013: 297). Validity of the instrument's usage, requires evidence as to whether the instrument does indeed accomplish what it is supposed to accomplish (Theo, 2013: 23). However, the question regarding validity comprises more than solely a judgement about the way of measuring. Validity also concerns research as a whole (Jonker & Pennink, 2010: 103). There are many forms of validity mentioned in the research literature, but usually there are two major forms: external and internal validity (Barua & Sinha, 2015: 71). The authors defined the external validity of research findings as "the data's ability to be generalised across individuals, settings, and times", and internal validity as "the ability of a research instrument to measure what it is supposed to measure". Kumar (2013: 167) identifies three types of validity in quantitative research:

- Content or face validity,
- Predictive or concurrent validity,
- Construct validity.

Barua and Sinha (2015: 71) explained these concepts as follows:

- **Content or face validity:** "The content validity of a measuring instrument is the extent to which it provides sufficient coverage of the investigative questions guiding the study. If the instrument contains a representative sample of the universe of subject matter of interest, then content validity is said to be good".

- **Predictive or concurrent validity:** “The instrument’s validity might be determined by comparing it with another assessment, for example by a psychologist, or with a future observation of how well these applicants have done in the job. If both assessments are similar, the instrument used to make the assessment at the time of selection is assumed to have higher validity. These types of comparisons establish two types of validity: *predictive validity or concurrent validity*. Predictive validity is judged by the degree to which an instrument can forecast an outcome. Concurrent validity is judged by how well an instrument compares with a second assessment concurrently done: ‘It is usually possible to express predictive validity in terms of the correlation coefficient between the predicted status and the criterion’ (Kumar, 2013: 167).
- **Construct validity:** “In attempting to evaluate construct validity, first discriminant and convergent validity have to be assessed”.

By taking into account *that this study intended to measure hypothetical constructs, construct validity was used for the purpose of measuring the questionnaire*. Construct validity is a more sophisticated technique for establishing the validity of an instrument (Kumar, 2013: 167), as mentioned in section 1.9.2.2. Construct validity is based upon statistical procedures and is determined by ascertaining the contribution of each construct to the total variance observed in a phenomenon (Kumar, 2013: 167). *Thus, for this study, construct validity was the most appropriate measurement for the questionnaire.*

4.9.2 RELIABILITY OF THE STUDY

Reliability refers to the quality of a measurement procedure that provides repeatability and accuracy (Kumar, 2013: 26). Data retrieved may look authoritative, but it could be incomplete or inaccurate, or may not be sufficiently reliable to be of value in generalising to the larger population (Ingham-Broomfield, 2014: 34). The reliability is an integral part of the validity of the test (Theo, 2013: 21). The concept of reliability, in relation to a research instrument, has a similar meaning: if a research tool is consistent and stable, hence predictable and accurate, it is said to be reliable;

meaning the greater the degree of consistency and stability in an instrument, the greater its reliability (Kumar, 2013: 168). Therefore, the author concluded that reliability is the degree of accuracy or precision in the measurements made by a research instrument. The lower the degree of 'error' in an instrument, the higher the reliability. According to Sauro (2015), there are four ways of measuring reliability for any empirical method or metric, which is most common. Research Rundowns (2010) defines the four types of reliability as follow:

- **Inter-rater/Observer reliability:** The degree to which different raters/observers give consistent answers or estimates.
- **Test-retest reliability:** The consistency of a measure evaluated over time.
- **Parallel-forms reliability:** The reliability of two tests constructed the same way, from the same content.
- **Internal consistency reliability:** The consistency of results across items, often measured with Cronbach's Alpha. As specified by Sauro (2015), internal consistency reliability is by far the most commonly used measure of reliability in applied settings. It is popular because it is the easiest to compute using software. It requires only one sample of data to estimate the internal consistency reliability. This measure of reliability is described most often using Cronbach Alpha (sometimes called Alpha coefficient).

The reliability of the questionnaire was measured by calculating the Cronbach's Alpha. Cronbach's Alpha measures how consistently participants respond to one set of items (Sauro, 2015). In addition to that, Cronbach's Alpha ranges from 0.0 to 1.0 (a negative alpha means the researcher probably needs to reverse some items). The author also reported that, since the late 1960s, the minimally acceptable measure of reliability has been 0.70, in practice, though, for high-stakes questionnaires, aim for greater than 0.90.

4.10 ETHICAL CONSIDERATIONS

Today, ethical issues in research commands increased attention. The ethical considerations that need to be anticipated are extensive, and they are reflected through the research process (Creswell, 2013: 132). Withal, the author asserted that these issues apply to qualitative, quantitative, and mixed methods of research, and to all stages of research. All professions are guided by a code of ethics, which evolved over years, to accommodate the changing values, needs and expectations of the authorised bodies (Babikir, *et al.*, 2010: 20). According to the authors, being ethical means adhering to these codes of conduct, and some professions have very strict guidelines, monitor conduct effectively, and take appropriate steps against those who do not abide by the guidelines.

Ethical issues in research can be looked at as how they relate to participants, researchers and sponsoring organisations. Ethical issues concerning research participants include (Babikir, *et al.*, 2010: 20):

- Collecting information.
- Seeking consent.
- Providing incentives.
- Seeking sensitive information.
- The possibility of causing harm to participants.
- Maintaining confidentiality.

Ethical issues relating to the researcher include:

- Avoiding bias.
- Provision or deprivation of a treatment.
- Using appropriate research methodology.
- Correct reporting.
- Using information.

Ethical issues regarding the sponsoring organisation lies in the use of the collected information.

Research ethics requires that participants be treated fairly and with respect. This means that they must be provided with information about the nature of the study, to enable them to make a meaningful decision as to whether or not they really want to be involved (Lazar, *et al.*, 2010: 368). Prior to the study, researchers need to obtain approval of individuals in authority (i.e. gatekeepers) to gain access to sites and to study participants. This often involves writing a letter that specifies the extent of time, the potential impact, and the outcomes of the research (Creswell, 2013: 135). It is important that informed consent be obtained after full explanation of the study's intent (Allen, *et al.*, 2010: 1676). This notion of informed consent is a critical component of modern research on human subjects (Lazar, *et al.*, 2010: 368). Informed consent means that the individual understands what the researcher wants him/her to do, and consents to the research study (Zikmund, *et al.*, 2010: 90). Written permission was obtained to conduct the empirical research in the particular South African automotive manufacturing organisation. The respondents were informed of top management's permission to do the study, and that they can participate voluntarily in the study. A completed questionnaire received back was regarded as consent to participate. Participants should also be assured that their privacy will be protected (Lazar, *et al.*, 2010: 380). Confidentiality means that information involved in the research will not be shared with others, when the respondent truly believes that confidentiality will be maintained, it becomes much easier to respond truthfully, even about potentially sensitive topics (Zikmund, *et al.*, 2010: 91).

This study guaranteed:

- The anonymity, the privacy and the confidentiality of the organisation and the individual respondents' identity.
- The anonymity, the privacy and the confidentiality of the collected data:
 - The paper-based record is kept in a secure location and is only accessible to the researcher and the supervisor involved in the study.

- The mentioned parties involved in the study signed statements agreeing to protect the security and confidentiality of identifying information.
- The anonymity of the South African automotive manufacturer. The participating South African automotive manufacturing organisation was only addressed as “automotive manufacturer” throughout the study.

4.11 SUMMARY

The goal of this chapter was to present and outline the research methodology used for achieving the objectives of this study. The first eight sections dealt with the definition of research, the definition of research design, the research question, the research objectives, the research hypothesis and the research methodology. The justification for the research method, the population and sampling, the variables for quantitative research, the survey method, the research instrument, the data collection, the data analysis, the validity and reliability for this study and the ethical considerations were then discussed.

CHAPTER 5

DATA ANALYSIS

5.1 INTRODUCTION

The previous chapter outlined the research methodology utilised in this study. The data was collected by means of a web-based questionnaire (monkey survey) and personally distributed and collected paper-based questionnaires.

This chapter presents the quantitative research results of the analysis obtained from the questionnaires. The focal point of this chapter is to discuss the analysis of the research findings which focus on three areas: namely *descriptive statistics*, *exploratory factor analysis*, and *reliability assessment and inferential statistics*. As mentioned in section 1.9.1, quantitative research attempts to establish statistically significant relationships, addresses questions by measuring and describing, is based on objective measurement and observation, and is concerned with correlation and causation (Hamer & Collinson, 2014). Quantitative analysis techniques, such as graphs, charts and statistics, allow the researcher to explore, present, describe and examine relationships and trends within the researcher's data (Saunders, *et al.*, 2009: 414). It is important that the researcher keeps his/her research question(s) and objectives in mind when exploring the data (Saunders, *et al.*, 2009: 428).

The data analysis of this research was done for testing the hypothesis formulated earlier in the previous chapter (section 4.7) and achieving the empirical research objectives.

5.2 THE STATISTICAL ANALYSIS

In this study, the statistical analysis included:

- Descriptive statistics that include frequency tables, means, medians and standard deviations.
- Exploratory factor analysis and the calculation of Cronbach's Alpha values to test construct validity and internal consistency (reliability).
- Inferential statistics including t-tests and ANOVA (one way analysis of variance) to test for statistical significant differences between the categories for the demographic characteristics with regards to each of the constructs measured.
- Correlation analysis between all the identified constructs.
- Regression analysis to determine the strength and direction of the relationship between the different HRM constructs and SCM effectiveness.

5.3 RESPONSE RATE

The questionnaire was sent to the entire supply chain team consisting of 110 respondents, located at two different plants of the participating organisation. A total of 60 e-mail invitations to participate in the survey were sent to the targeted participants (far away participants) of which 28 responses were received, and 50 paper-based questionnaires (close-by participants) were also administered to the targeted participants, only 43 hard copies of the questionnaire were received. In total 71 responses, which represent a response rate of 64.54 %, were received.

5.4 DATA PROCESSING

The completed questionnaires were coded, and data obtained was captured on an Excel spreadsheet. Thereafter, same was analysed by means of SPSS 25 (a statistical software program) with the assistance of a statistician. Excel, SAS, and SPSS account for most of the statistical analysis conducted in business research (Zikmund, *et al.*, 2010: 499). SPSS 25 was used to analyse the data. The results of the data analysis are provided below.

5.5 DEMOGRAPHICAL INFORMATION

In section C of the questionnaire, all participants were asked questions regarding their age, highest level of education, marital status, total years of work experience, gender, functional area, management level, time at the organisation, and time in current job level.

5.5.1 AGE

The youngest respondent was 20 years of age and the oldest was over 50 years. **Figure 5.1** below depicts the age of the respondents who participated in the study.

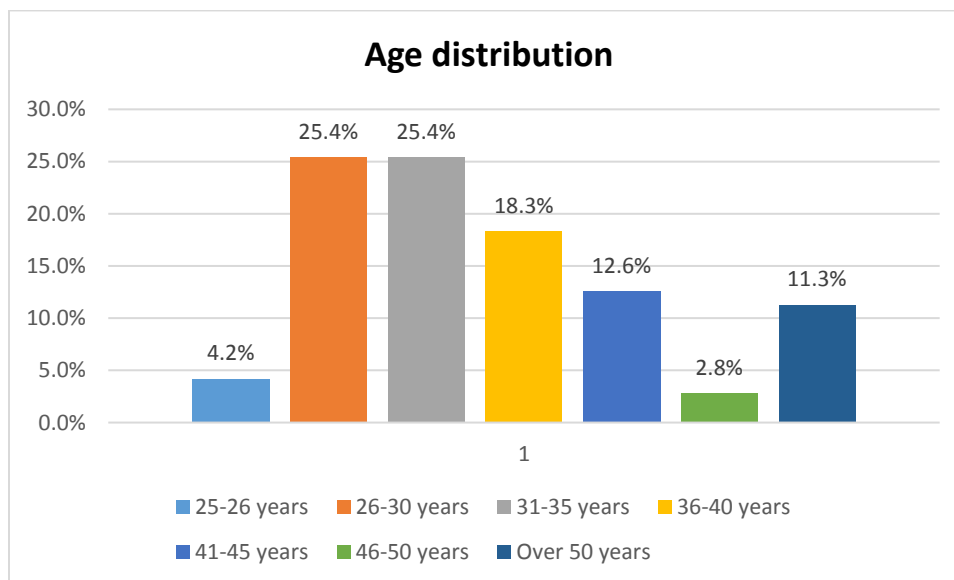


Figure 5.1 Age distribution (n= 71)

The age groups with the majority of respondents were aged between 26-35 years, with just over half (50.8 %) falling into those groups. If one adds the 36-40 group, it includes almost 70 % of the respondents. It is clear that most respondents (workforce in the supply chain) are young and early in their careers.

5.5.2 EDUCATION

Respondents were asked to indicate their highest level of formal education they had completed. They had to choose one of the following seven options: matric/ Grade12, tertiary diploma/ certificate, bachelor degree, honours degree, master's degree, doctorate and other. **Figure 5.2** illustrates the formal education of the respondents.

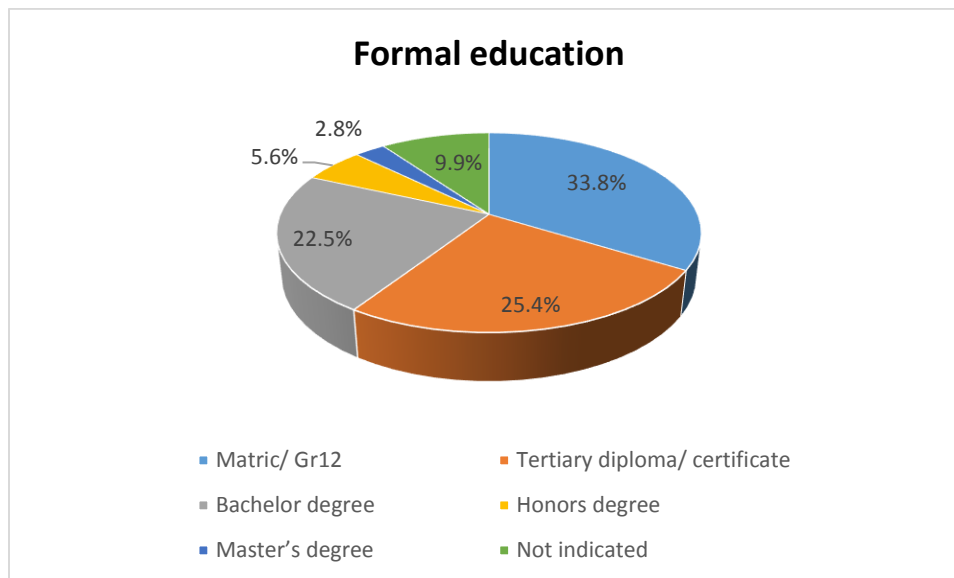


Figure 5.2: Formal education (n= 71)

A third (33.8 %) of the respondents indicated that they had a Matric/Grade 12, while a quarter (25.4 %) indicated that they had a tertiary diploma/certificate. Only 22.5 % of the respondents indicated that they had a bachelor degree, 8.4 % had a postgraduate qualification and 9.9 % did not answer the question.

5.5.3 MARITAL STATUS

Respondents were asked to indicate their marital status. The following two options were given to them: single and married/ living together with a partner. **Figure 5.3** below depicts the marital status of the respondents.

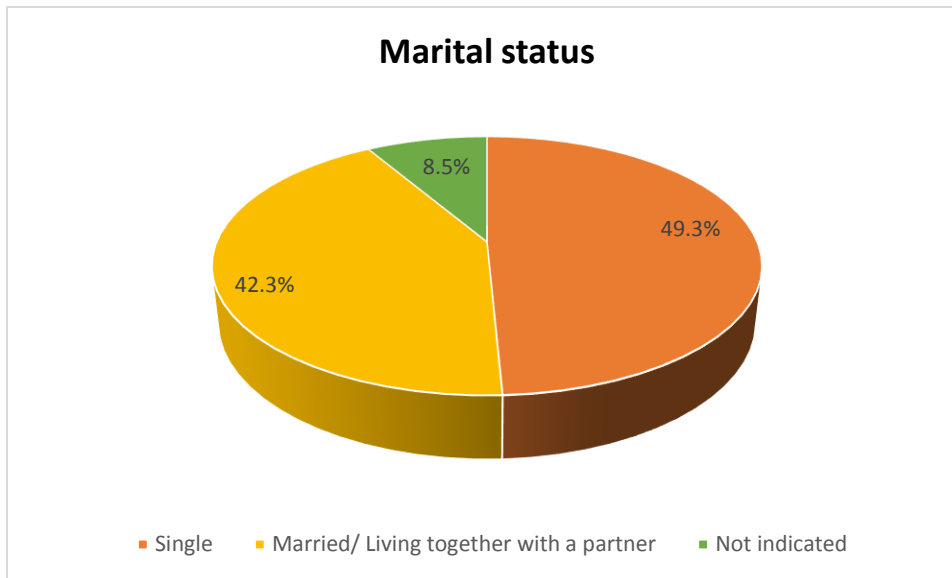


Figure 5.3: Marital status (n=71)

Almost half (49.2 %) of the respondents indicated that they were married/living together with a partner, while 42.2 % of the respondents indicated that they were single. Seven (8.5 %) of the respondents did not answer the question.

5.5.4 WORK EXPERIENCE

The next question the respondents were asked, related to years of work experience. **Figure 5.4** illustrates the responses by the participants.

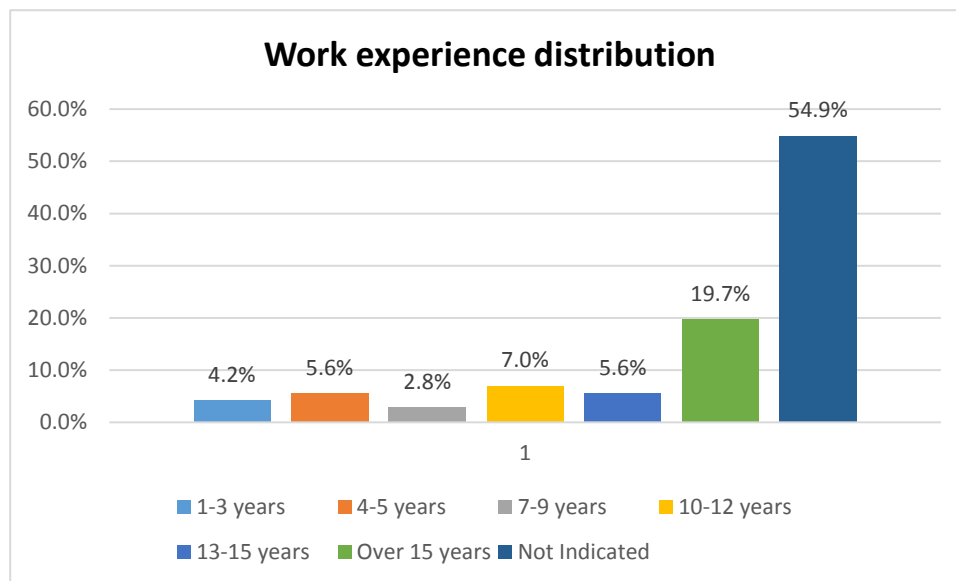


Figure 5.4: Work experience distribution (n= 71)

The work experience group with the most respondents (modal category) were those with over 15 years' experience, with 19.7 % falling into that group. It is clear that the supply chain management staff is quite experienced with 32.3 % being employed in the supply chain for over 10 years. A very large percentage of the respondents (54.9 %) did not complete the question.

5.5.5 GENDER

The respondents were asked to indicate their gender. **Figure 5.5** portrays the gender of the respondents who participated in the study.

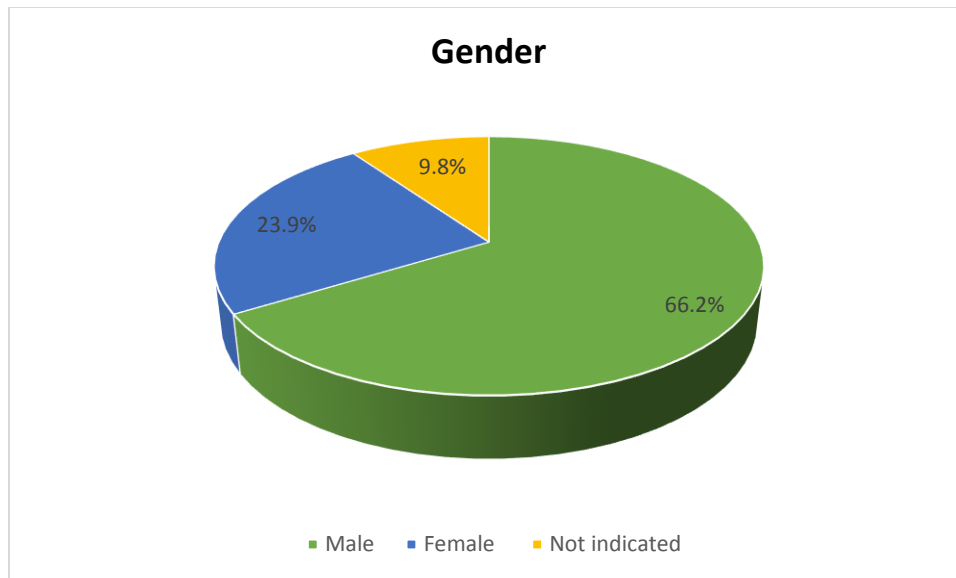


Figure 5.5: Gender (n= 71)

It is clear from **figure 5.5** that the majority of the respondents (supply chain management staff) were male (66.2 %). 23.9% of the respondents were female, with 9.8 % of the respondents who did not answer the question.

5.5.6 FUNCTIONAL AREA

Respondents were asked to indicate their functional area. **Figure 5.6** depicts the functional area of the respondents who participated in the study.

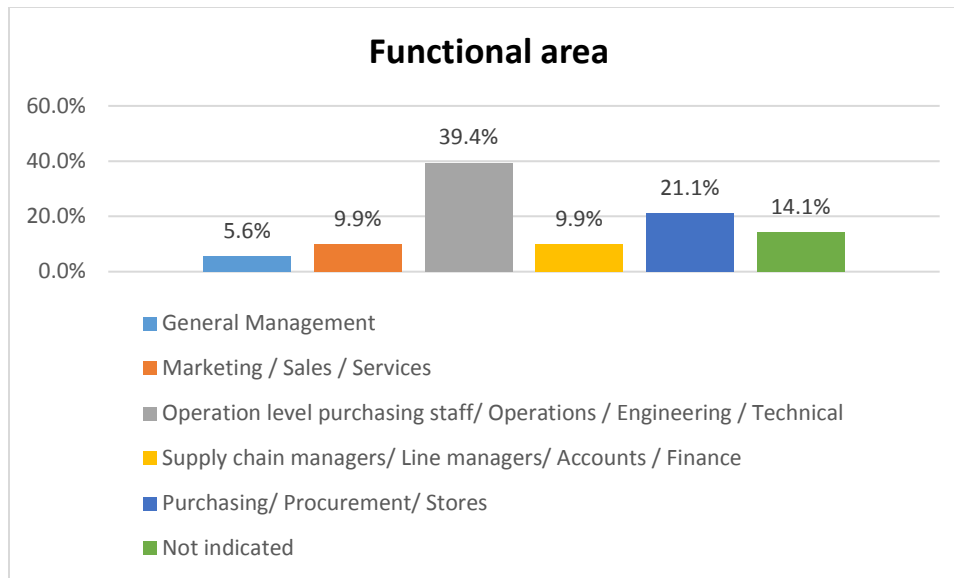


Figure 5.6: Functional area (n= 71)

Almost 40 % (39.4 %) of the respondents who participated in the study were operation level purchasing staff/ operations/ engineering/ technical staff. Only 5.6 % indicated that their functional area is general management. 14.1 % of the respondents did not complete this question.

5.5.7 MANAGEMENT LEVEL

Respondents were asked to indicate their management level. **Figure 5.7** illustrated the management level of the respondents who participated in the study.

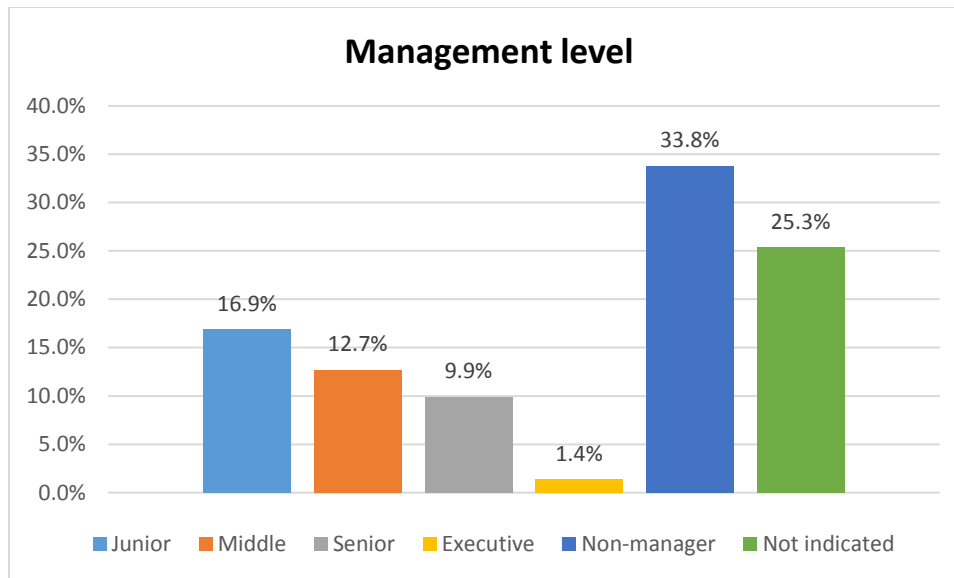


Figure 5.7: Management level (n= 71)

A third of the respondents (33.8 %) were non-managers. Almost a quarter of the respondents (24 %) were from middle management and upwards.

5.5.8 TIME AT ORGANISATION

Respondents were asked to indicate their time at the organisation. **Table 6.1** provided the mean, median, standard deviation, minimum and maximum values. The average time at the organisation was 6.2 years with a minimum of .08 years and a maximum of 26 years.

Table 5.1: Time at organisation

		JobTime
N	Valid	69
	Missing	2
Mean		6.2004
Median		3.0000
Std. Deviation		7.45126
Minimum		0.08
Maximum		28.00

5.5.9 TIME IN CURRENT JOB LEVEL

Respondents were asked to indicate their time at their current job level. **Table 6.2** provided the mean, median, standard deviation, minimum and maximum values. The average time at the current job level was 4.02 years with a minimum of .12 years and a maximum of 17.42 years.

Table 5.2: Time in current job level

		PositionTime
N	Valid	68
	Missing	3
Mean		4.0153
Median		2.1650
Std. Deviation		4.31159
Minimum		0.12
Maximum		17.42

5.6 DESCRIPTIVE STATISTICS

5.6.1 INTRODUCTION

Descriptive statistics are brief descriptive coefficients that summarise a given data set, which can be either a representation of the entire or sample population (Investopedia, 2018). The descriptive statistics are defined as simple measures of the distribution's central tendency and variability (Salkind, 2012: 162) and they help the researcher to explain the data more accurately and in greater detail than graphical displays (Jones & Bartlett Learning, 2012).

Descriptive statistics enable the researcher to describe (and compare) variables numerically. The researcher's research question(s) and objectives, although limited by the type of data, should guide his/her choice of statistics (Saunders, *et al.*, 2009: 444). Statistics to describe a variable focus on two aspects:

- the central tendency.

- the dispersion .

Descriptive statistics can also be frequency tables in the case of the nominal and ordinal data for which a standard deviation and mean is strictly not defined. Means are sometimes used for ordinal data to explore trends, but not for utilisation in tests.

Descriptive statistics were conducted to summarise each of the HRM practices and SCM issues using a combination of tabulated description (frequency tables), graphical description (stacked charts) and statistical commentary (discussion of the results).

Respondents were asked in section A of the questionnaire to indicate their level of agreement regarding how given statements (20 statements) relate to the way in which he/she, as supply chain employee, perceive/experience the human resource practices within their organisation. Respondents could rate these practices as strongly disagree, disagree, neither agree nor disagree, agree and strongly agree. Responses of ‘strongly disagree’ or of ‘disagree’ were grouped together, while responses of ‘strongly agree’ or ‘agree’ were also grouped together, and the response to neither agree nor disagree was used separately and are depicted in **figure 5.8, 5.9, 5.10, 5.11, 5.12 and 5.13.**

In section B of the questionnaire, respondents were asked to indicate the importance of given practices (11 statements) in the organisation’s implementation of the supply chain management approach. Respondents could rate them as of no importance, of minor importance, of moderate importance, of large/high importance, or of extreme importance. Responses of ‘large/high importance’ or of ‘extreme importance’ were grouped together while responses of ‘no importance’ or of ‘minor importance’ were also grouped together, the response to moderate importance was used separately and are illustrated in **figure 5.14.**

5.6.2 DESCRIPTIVE STATISTICS FOR ‘SELECTION’

The following area was studied, and each of the three items of selection (as HRM practice) are included in the graph below.

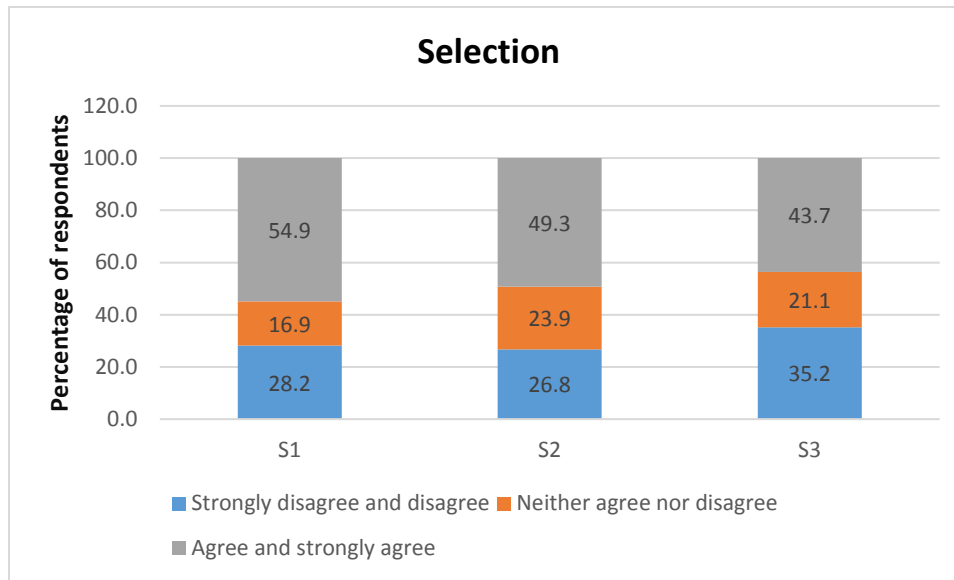


Figure 5.8 Stacked chart for selection

Just over half (54.9 %), and just under half (49.3 %), of the respondents agreed or strongly agreed with the statement S1: ‘workers in this organisation are selected based only on their competencies which are needed to attain organisational goals’; and S2: ‘a range of assessment methods are utilised in the selection process to evaluate the abilities of the potential employees, respectively as depicted in **figure 5.8**. This is of concern, as almost 30% of the respondents disagreed or strongly disagreed with these statements, which indicates that the automotive manufacturer may require additional support when it comes to the selection of employees and the range of assessment methods used in their selection process.

With regards to statement S3: ‘only the right people with the right skills are selected to work in this organisation?’, as illustrated in **figure 5.8**, only 43.7 % of the respondents agreed or strongly agreed. Some 35.2 % of the respondents strongly disagreed or disagreed, highlighting an area of concern in terms of a lack of the appropriate skillsets of supply chain personnel, which needs to be addressed. From **figure 5.8** it is clear that the organisation is regarded as average when it comes to selection from an employee’s perspective. Therefore, the automotive manufacturing organisation may require some proactivity and flexibility in terms of their approach in selecting the appropriate supply chain staff with suitable skillsets.

5.6.3 DESCRIPTIVE STATISTICS FOR ‘EVALUATION’

The following area was studied and each of the four items of evaluation (as HRM practice) are included in the graph below.

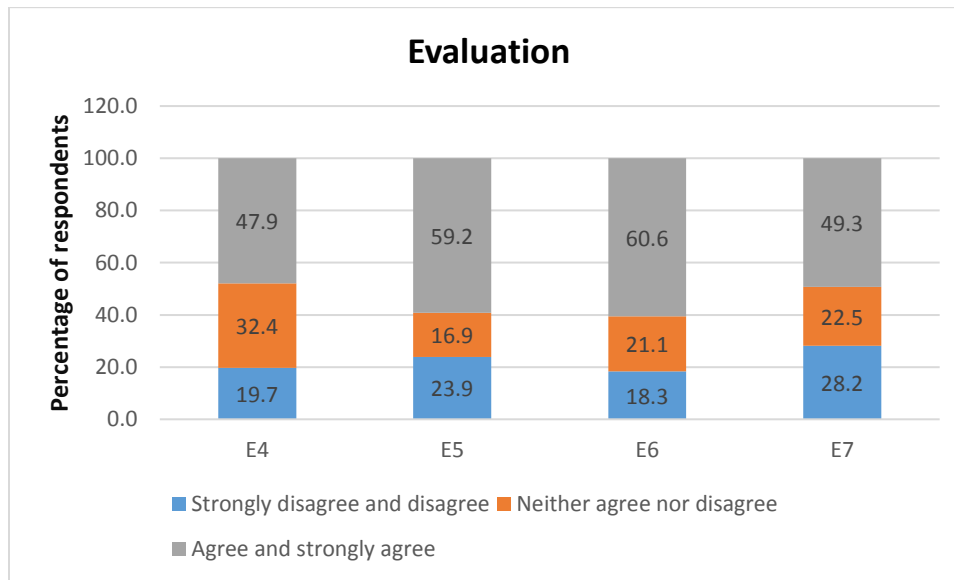


Figure 5.9: Stacked chart for evaluation

Just under half (47.9 % and 49.3 %) respectively of the respondents agreed or strongly agreed with the statements E4: ‘this organisation continuously evaluates the performance of its employees (including management positions)’, and E7: ‘this organisation has suitable measurement instruments for successful grading levels’ as depicted in **figure 5.9**. Furthermore, just over half of the respondents that strongly disagreed, disagreed (28.2 %) and neutral (22.5 %) with these statements, indicating that the automotive manufacturer may need to establish an effective performance appraisal system for the employees.

With regards to the statements E6: ‘this organisation provides feedback on evaluation to their employees so that they can improve their performance’, and E5: ‘this organisation provides feedback on evaluation to their employees so that they can direct and correct their performance’ respectively as illustrated in **figure 5.9**. A fairly high percentage, 60.6 % and 59.2% respectively,

of the respondents agreed or strongly agreed. Although low, under a fifth (18.3 %) and over a fifth (23.9 %) of the respondents disagreed or strongly disagreed with these statements. A lack of feedback or current feedback mechanisms are important aspects which need to be addressed. The automotive manufacturer may need some additional support when it comes to establishing feedback strategies.

5.6.4 DESCRIPTIVE STATISTICS FOR ‘TRAINING’

The following area was studied and each of the three items of training (as HRM practice) are included in the graph below.

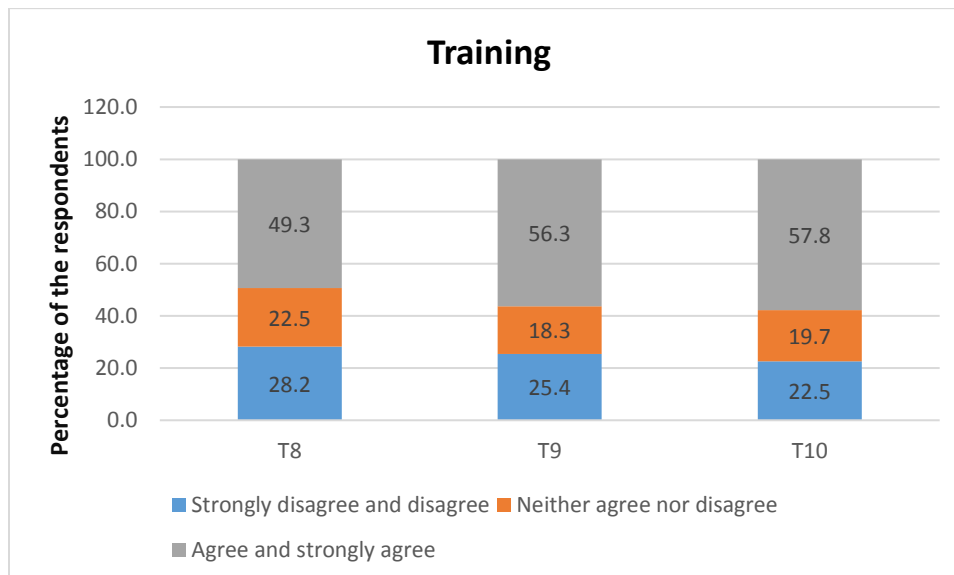


Figure 5.10: Stacked chart for training

With regards to statement T8: ‘this organisation offers adequate training programs for employees in the supply chain’, just less than 50 % (49.3 %) of the respondents agreed or strongly agreed. A total of 28.2 % of the respondents strongly disagreed and disagreed which indicates that not all employees at the automotive manufacturer receive adequate training, and that the organisation may be required to investigate areas where improved and appropriate training programs are needed for all their employees.

The majority, slightly over half (56.3 %) and (57.8 %) of the respondents agreed and strongly agreed with statement T9: ‘this organisation considers training as important to improving the performance of employees’, and T10: ‘training provided by this organisation consists of equipping employees with the desired knowledge, skills and abilities to achieve organisational goals’, respectively as portrayed in **figure 5.10**. Almost a quarter of the respondents disagreed or strongly disagreed with these statements which indicates that the automotive manufacturer may need to comprehend the bottom line significance of effective training programs and provide focused formal training to their employees.

5.6.5 DESCRIPTIVE STATISTICS FOR ‘COMPENSATION’

The following area was studied and each of the three items of compensation (as HRM practice) are included in the graph below. Note that the percentage of C11 and C12 do not add up to 100 % due to missing values.

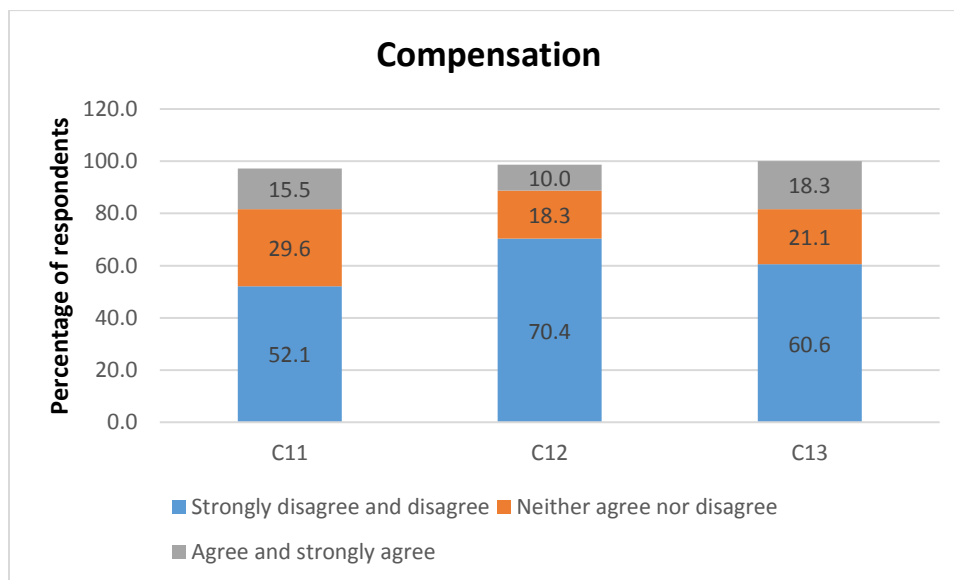


Figure 5.11: Stacked chart for compensation

With regards to all the statements, it is concerning that less than 20 % of the respondents agree or strongly agree with the statements. The majority of the respondents disagreed or strongly disagreed with all the statements (C11, C12 and C13). These results show that the automotive manufacturing

organisation may need to address and re-plan their pay-for-performance programs, as well as their reward systems and benchmark their remuneration against other automotive manufacturers.

5.6.6 DESCRIPTIVE STATISTICS FOR ‘COMMUNICATION’

The following area was studied and each of the three items of communication (as HRM practice) are included in the graph below.

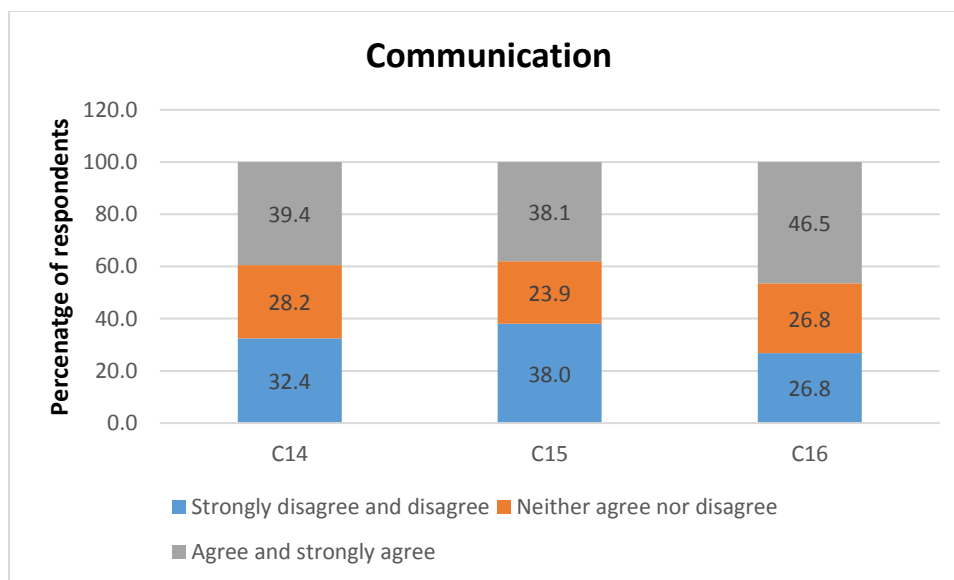


Figure 5.12 Stacked chart for communication

Almost 40 % (39.4 % and 38.1 %) of the respondents agreed and strongly agreed with statements C14: ‘employees in this organisation effectively collaborate across functional areas’, and C15: ‘there is effective communication among organisation employees in this organisation’, respectively as illustrated in **figure 5.12**. Almost an equal percentage of the respondents strongly disagreed or disagreed with statements C14 and C15, underscoring a critical aspect related to a poor internal communication which needs to be addressed, particularly in an organisation following a supply chain management approach.

With regards to statement C16: ‘this organisation’s employees communicate effectively with its external supply chain partners (suppliers and customers)’, as depicted in **figure 5.12**. Just less than

half (46.5 %) of the respondents agreed and strongly agreed. 26.8 % of the respondents disagreed or strongly disagreed with statement C16, highlighting that effective communication with external supply chain partners can be improved on.

5.6.7 DESCRIPTIVE STATISTICS FOR ‘SOCIALISATION’

The following area was studied and each of the four items of socialisation (as HRM practice) are included in the graph below.

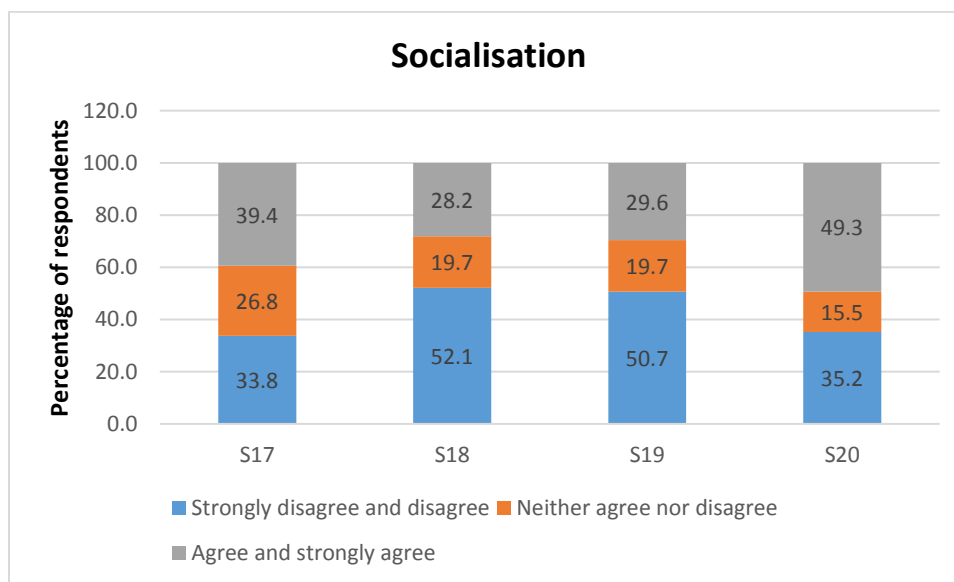


Figure 5.13: Stacked chart of socialisation

With regards to statement S17: ‘in this organisation, the majority of managers and employees interact well’ as portrayed in **figure 5.13**. 39.4 % of the respondents agreed or strongly agreed. Not far behind, 33.8 % of the respondents disagreed and strongly disagreed, underlining that not all employees perceive interaction between managers and employees as positive. As this influences overall productivity, it is a critical aspect which needs to be addressed.

Only 28.2 % and 29.6 % of the respondents agreed or strongly agreed with statement S18: ‘this organisation encourages socialisation methods like group conferences, multifunctional teams and joint workshops for employees’, and statement S19: ‘this organisation encourages effective socialisation where employees are given the opportunity to share work related experience,

knowledge, concerns, questions and solutions’, respectively as depicted in **figure 5.13**. Over 50 % of the respondents strongly disagreed or disagreed with these statements, indicating that the automotive manufacturer does not make effective socialisation opportunities available between employees.

With regards to statement S20: ‘this organisation offers a positive working environment for employees’, as illustrated in **figure 5.13**, just under half (49.3 %) of the respondents agreed or strongly agreed. Only 35.2 % strongly disagreed or disagreed. This indicated that the automotive manufacturing organisation may do better with cultivating an improved positive work atmosphere for their employees.

5.6.8 DESCRIPTIVE STATISTICS FOR SUPPLY CHAIN MANAGEMENT

The following area was studied and each of the 11 statements (SCM21 to SCM31) of supply chain management practices are included in the graph below.

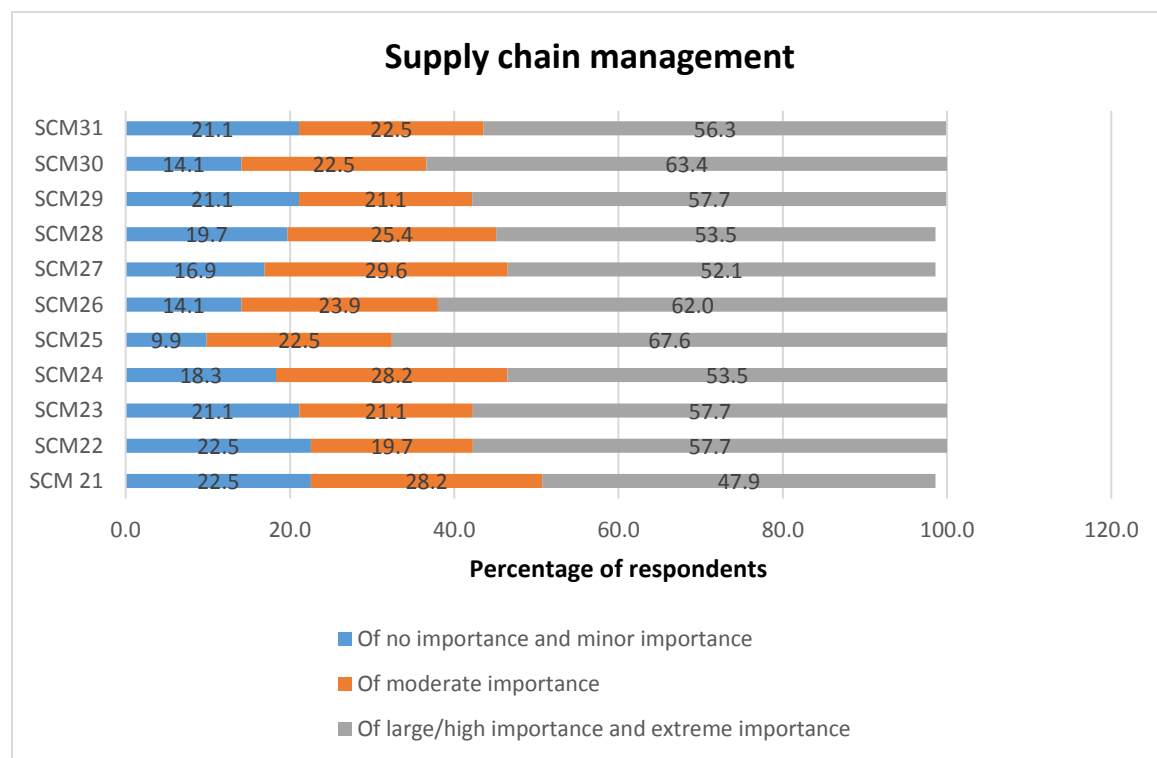


Figure 5.14: Stacked chart for supply chain management

With the exception of statement SCM 21: ‘every employee in SCM sees his/her work as part of a system (organisation, supply chain or value chain) as portrayed in **figure 5.14**, thereby contributing to the overall effectiveness and performance of the broader system a slight majority, between 52.1 % and 67.6 %, considered all areas as of large or extreme importance. The area considered by the largest number of respondents (67.6 %), as of large or critical importance, is good long-term relationships with important suppliers and customers.

Over 60 % (62.0 %, 63.4 % and 67.6 %) of the respondents perceived statement SCM26: ‘technical skills of employees in SCM’, statement SCM30: ‘cost saving as performance element’ and statement SCM25: ‘good long-term relationships with important suppliers and customers, based on trust’, as of large or extreme importance as portrayed in **figure 5.14**. Almost over 10 % of the respondents considered these statements (SCM26, SCM30 and SCM25) as of no importance or minor importance.

Over half (52.1 %, 53.5 %, 53.5 %, 56.3 %, 57.7 %, 57.7 % and 57.7 %) of the respondents considered statement SCM27: ‘interpersonal skills of employees in SCM’, statement SCM24: ‘every employee in the SCM be flexible, responsive and innovative in changing circumstances’, statement SCM28: ‘analytical skills (problem solving) of employees in SCM’, statement SCM31: ‘balance in the elements of service, quality, and cost as performance evaluation elements’, statement SCM 22: ‘information technology integrates and coordinates processes in the supply chain’, statement SCM23: ‘good relationships between individuals in the SCM function, between functions and different levels’, and statement SCM29: ‘business knowledge and skills of employees in SCM’, as of large or extreme importance as illustrated in **figure 5.14**. Almost over 20 % of the respondents viewed these statements (SCM27, SCM31, SCM22, SCM23 and SCM29) as of no importance or minor importance.

5.7 EXPLORATORY FACTOR ANALYSIS (EFA)

5.7.1 INTRODUCTION

According to Taherdoost, Sahibuddin and Jalaliyoon (2014), exploratory factor analysis is a complex and multivariate statistical technique commonly employed in information system, social science, education and psychology. In EFA, the investigator has no expectations of the number or nature of the variables and as the title suggests, is exploratory in nature (Williams, Onsman & Brown, 2010: 3). Furthermore, it allows the researcher to explore the main dimensions to generate a theory, or model, from a relatively large set of latent constructs often represented by a set of items.

Explorative factor analysis was conducted on each of the six HRM practices and the supply chain practices/issues, using a principal axis factoring as extraction method, and promax as rotation method.

5.7.2 EXPLORATORY FACTOR ANALYSIS FOR ‘SELECTION’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.712) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for selection. **Table 5.3** below shows the mean and the standard deviation of each item of selection as HRM practice.

Table 5.3: Descriptive analysis for selection

Descriptive Statistics			
Item	Mean	Std. Deviation	Analysis N
SELECTION_1	3.28	1.221	71
SELECTION_2	3.20	1.077	71
SELECTION_3	3.00	1.287	71

The analysis identified *one factor* based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 76.155% of the variance.

The final factor loadings of selection are shown below in **table 5.4**

Table 5.4: Factor matrix for selection

Factor Matrix ^a	
	Factor
	1
SELECTION_1	0.789
SELECTION_2	0.731
SELECTION_3	0.887

5.7.3 EXPLORATORY FACTOR ANALYSIS FOR ‘EVALUATION’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.778) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for evaluation as a HRM practice. In **table 5.5** below the mean and the standard deviation of each item of evaluation.

Table 5.5: Descriptive statistics for evaluation

Descriptive Statistics			
Item	Mean	Std. Deviation	Analysis N
EVALUATION_4	3.28	1.017	71
EVALUATION_5	3.38	1.061	71
EVALUATION_6	3.45	0.968	71
EVALUATION_7	3.18	1.086	71

The analysis identified *one factor* based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 73.027% of the variance.

The final factor loadings for evaluation are shown below in **table 5.6**

Table 5.6: Factor matrix for evaluation

Factor Matrix ^a	
	Factor
	1
EVALUATION_4	0.825
EVALUATION_5	0.876
EVALUATION_6	0.907
EVALUATION_7	0.588

5.7.4 EXPLORATORY FACTOR ANALYSIS FOR ‘TRAINING’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.749) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for training as HRM practice. In **table 5.7** the mean and the standard deviation of each item in training.

Table 5.7: Descriptive statistics of training

Descriptive Statistics			
Items	Mean	Std. Deviation	Analysis N
TRAINING_8	3.25	1.273	71
TRAINING_9	3.35	1.299	71
TRAINING_10	3.37	1.222	71

The analysis identified one factor based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 93.229% of the variance.

The final factor loadings for training are shown below in **table 5.8**

Table 5.8: Factor matrix for training

Factor Matrix ^a	
	Factor
	1
TRAINING_8	0.975
TRAINING_9	0.979
TRAINING_10	0.890

5.7.5 EXPLORATORY FACTOR ANALYSIS FOR ‘COMPENSATION’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.672) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for compensation as a HRM practice. In addition, **table 5.9** shows the mean and the standard deviation of each item.

Table 5.9: Descriptive statistics for compensation

Descriptive Statistics			
	Mean	Std. Deviation	Analysis N
COMPENSATION_11	2.246	1.1881	71
COMPENSATION_12	1.986	0.9927	71
COMPENSATION_13	2.23	1.161	71

The analysis identified *one factor* based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 70.127% of the variance.

The final factor loadings for compensation are shown below in **table 5.10**

Table 5.10: Factor matrix for compensation

Factor Matrix ^a	
	Factor
	1
COMPENSATION_11	0.661
COMPENSATION_12	0.679
COMPENSATION_13	0.897

5.7.6 EXPLORATORY FACTOR ANALYSIS FOR ‘COMMUNICATION’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.706) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for communication as a HRM practice. In addition, **table 5.11** shows the mean and the standard deviation of each item of communication.

Table 5.11: Descriptive statistics for communication

Descriptive Statistics			
Item	Mean	Std. Deviation	Analysis N
COMMUNICATION_14	2.99	0.993	71
COMMUNICATION_15	3.00	1.134	71
COMMUNICATION_16	3.15	1.203	71

The analysis identified one factor based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 76.696% of the variance.

The final factor loadings for communication are shown below in **table 5.12**.

Table 5.12: Factor matrix for communication

Factor Matrix ^a	
	Factor
	1
COMMUNICATION_14	0.883
COMMUNICATION_15	0.848
COMMUNICATION_16	0.693

5.7.7 EXPLORATORY FACTOR ANALYSIS FOR ‘SOCIALISATION’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.706) and the Barlett’s Test of Sphericity, which was significant ($p= 0.000$), both indicate that a factor analysis is appropriate for socialisation as a HRM practice. In addition, **table 5.13** shows the mean and the standard deviation of each item of socialisation.

Table 5.13: Descriptive statistics for socialisation

Descriptive Statistics			
Item	Mean	Std. Deviation	Analysis N
SOCIALISATION_17	2.92	1.192	71
SOCIALISATION_18	2.51	1.194	71
SOCIALISATION_19	2.62	1.163	71
SOCIALISATION_20	3.07	1.223	71

The analysis identified *one factor* based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 72.201% of the variance.

The final factor loadings for socialisation are shown below in **table 5.14**.

Table 5.14: Factor matrix for socialisation

Factor Matrix ^a	
	Factor
	1
SOCIALISATION_17	0.707
SOCIALISATION_18	0.899
SOCIALISATION_19	0.783
SOCIALISATION_20	0.784

5.7.8 EXPLORATORY FACTOR ANALYSIS FOR ‘SUPPLY CHAIN MANAGEMENT’

The Kaiser-Meyer Olkin Measure of Sampling Adequacy (0.915) and the Barlett’s Test of Sphericity, which was significant ($p=0.000$), both indicate that a factor analysis is appropriate for supply chain management practices. In addition, **table 5.15** shows the mean and the standard deviation of each item of supply chain management.

Table 5.15: Descriptive statistics for supply chain management

Descriptive Statistics			
	Mean	Std. Deviation	Analysis N
SUPPLYCHAINMANAGEM_21	3.286	1.2206	71
SUPPLYCHAINMANAGEM_27	3.414	1.1401	71
SUPPLYCHAINMANAGEM_28	3.457	1.2838	71
SUPPLYCHAINMANAGEM_22	3.52	1.217	71
SUPPLYCHAINMANAGEM_23	3.44	1.079	71
SUPPLYCHAINMANAGEM_24	3.44	1.143	71
SUPPLYCHAINMANAGEM_25	3.89	1.049	71
SUPPLYCHAINMANAGEM_26	3.59	1.050	71
SUPPLYCHAINMANAGEM_29	3.44	1.156	71
SUPPLYCHAINMANAGEM_30	3.70	1.126	71
SUPPLYCHAINMANAGEM_31	3.49	1.252	71

The analysis identified *one factor* based on the eigenvalue criterion of eigenvalues greater than one. The one factor explains 71.634 % of the variance.

The final factor loadings for supply chain management are shown below in **table 5.16**

Table 5.16: Factor matrix for supply chain management

Factor Matrix ^a	
	Factor
	1
SUPPLYCHAINMANAGEM_21	0.644
SUPPLYCHAINMANAGEM_27	0.904
SUPPLYCHAINMANAGEM_28	0.867
SUPPLYCHAINMANAGEM_22	0.826

SUPPLYCHAINMANAGEM_23	0.826
SUPPLYCHAINMANAGEM_24	0.839
SUPPLYCHAINMANAGEM_25	0.777
SUPPLYCHAINMANAGEM_26	0.878
SUPPLYCHAINMANAGEM_29	0.887
SUPPLYCHAINMANAGEM_30	0.852
SUPPLYCHAINMANAGEM_31	0.801

5.7.9 RELIABILITY TESTING

As indicated in section 4.9.2 of section 4, Cronbach's alpha was employed to measure the reliability of the items used in this study. Cronbach's alpha is a statistic commonly quoted by authors to demonstrate that tests and scales that have been constructed and adopted for research projects are fit for purpose (Taber, 2018: 1273). As specified in section 4.9.2, since the late 1960s, the minimally acceptable measure of reliability has been 0.70, in practice, though, for high-stakes questionnaires, the aim is far greater than 0.90 (Sauro, 2015). The summary of alpha scores is given in **table 5.17**.

Table 5.17: Reliability coefficients of the factors

Factors	Cronbach's alpha	Number of items
Selection	0.842	3
Evaluation	0.871	4
Training	0.964	3
Compensation	0.784	3
Communication	0.841	3
Socialisation	0.871	4
Supply chain management	0.959	11

The internal consistency (reliability) coefficients (Cronbach's alpha) for the items used for each construct in this study are found well above the level of 0.7, thereby indicating acceptable reliability. Therefore, the factors identified were considered acceptable for analysis purposes.

5.7.10 Descriptive statistics of the main factors

The descriptive statistics of the main factors (elements of human resource management) of this study include: selection, evaluation, training, compensation, communication, socialisation and implementation of supply chain management practices are summarised in **table 5.18** presented below.

Table 5.18: Descriptive statistics of the main factors (n= 71)

Statistics								
		Selection	Evaluation	Training	Compensation	Communication	Socialisation	SupplyChainPerf
N	Valid	71	71	71	71	71	71	71
	Missing	0	0	0	0	0	0	0
Mean		3.1596	3.3239	3.3239	2.1525	3.0469	2.7782	3.5149
Median		3.3333	3.5000	3.6667	2.0000	3.0000	2.7500	3.7273
Std. Deviation		1.04480	0.87769	1.22146	0.93367	0.96986	1.01291	0.97555
Skewness		-0.493	-0.710	-0.550	0.299	-0.319	-0.087	-0.686
Std. Error of Skewness		0.285	0.285	0.285	0.285	0.285	0.285	0.285
Kurtosis		-0.845	0.023	-0.603	-1.020	-0.726	-1.024	-0.179
Std. Error of Kurtosis		0.563	0.563	0.563	0.563	0.563	0.563	0.563
Minimum		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum		5.00	5.00	5.00	4.33	4.67	4.75	5.00

The results showed the automotive manufacturer's generally practiced HRM as follows: selection: (mean= 3.1596, SD= 1.04480); evaluation: (mean= 3.3239, SD= 0.87769); training: (mean= 3.3239, SD= 1.22146); and communication: (mean= 3.0469, SD= 0.96986), are all moderately practised in the organisation. Compensation is perceived to be less than optimally practised in the organisation (mean= 2.1525, SD= 0.93367) along with socialisation (mean= 2.7782, SD= 1.01291). The supply chain practices are perceived as of high importance by the automotive manufacturer (mean=3.5149, SD= 0.97555), indicating that the organisation embraces the supply chain management approach or philosophy.

5.8 INFERENCE STATISTICS

Inferential statistics help the researcher to make decisions about how the data he/she collected relates to his/her original hypotheses, and how they might be generalisable to a larger number of subjects than those that were tested (Salkind, 2012: 161). According to Kim (2015: 540), there are two types of statistical inference: parametric and nonparametric methods. The major distinction between them lies in the underlying assumptions about the data to be analysed. Parametric statistics involve numbers with known, continuous distributions (Zikmund, *et al.*, 2010: 517). When the data is interval or ratio scaled, and the sample size is large, parametric statistical procedures are appropriate. Non-parametric statistics are appropriate when the numbers do not conform to a known distribution.

In order to determine whether differences exist between the categories of the following demographic variables (marital status, gender, functional areas employed, management level and education), with regards to each of the HRM practices and the SCM importance, relevant parametric and non-parametric inferential statistical tests were conducted.

5.8.1 MARITAL STATUS

The student t-test for two independent groups is a commonly used inferential test of the statistical significance of the difference between two means based on two independent, unrelated groups (Salkind, 2009: 184).

The hypotheses to be tested are:

- H1: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *selection practices*.
- H2: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *evaluation practices*.
- H3: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *training practices*.
- H4: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *compensation practices*.
- H5: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *communication practices*.
- H6: There is a statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *socialisation practices*.
- H7: There is statistical significant difference between married/living together with a partner respondents, and single respondents, with regards to their level of agreement on *supply chain management importance*.

A 5% level of significance will be used. The mean and the standard deviation of all the HRM practices and the SCM importance per (marital status) group are presented in **table 5.19**.

Table 5.19: Group statistics (marital)

Group Statistics				
MaritalStatus		N	Mean	Std. Deviation
Selection	1	35	2.9619	1.04090
	2	30	3.4222	1.00166
Evaluation	1	35	3.2571	0.80779
	2	30	3.5000	0.84333
Training	1	35	3.1429	1.14414
	2	30	3.6000	1.20153
Compensation	1	35	2.1736	0.92086
	2	30	2.1667	0.94585
Communication	1	35	3.1619	0.92663
	2	30	3.0000	1.01332
Socialization	1	35	2.6643	1.06402
	2	30	2.9250	0.88364
SupplyChainPerf	1	35	3.4182	1.07003
	2	30	3.7269	0.71907

The results of the t test are presented in **table 5.20** below.

Table 5.20: Independent samples test

Independent Samples Test				
		t-test for Equality of Means		
		T	Df	Sig. (2-tailed)
Selection	Equal variances assumed	-1.808	63	0.075
	Equal variances not assumed	-1.814	62.130	0.075
Evaluation	Equal variances assumed	-1.184	63	0.241
	Equal variances not assumed	-1.180	60.587	0.243

Training	Equal variances assumed	-1.569	63	0.122
	Equal variances not assumed	-1.563	60.450	0.123
Compensation	Equal variances assumed	0.030	63	0.976
	Equal variances not assumed	0.030	60.949	0.976
Communication	Equal variances assumed	0.673	63	0.504
	Equal variances not assumed	0.668	59.429	0.507
Socialisation	Equal variances assumed	-1.064	63	0.292
	Equal variances not assumed	-1.079	62.947	0.285
SupplyChainImp	Equal variances assumed	-1.341	63	0.185
	Equal variances not assumed	-1.381	59.802	0.172

The null hypothesis of equal variances assumed could not be rejected for all construct ($p > 0.05$), except for the supply chain management factor, and we can thus assume equal variances for these constructs. In the case of supply chain management factor, we do reject the null hypothesis and thus need to use the test value associated with equal variances not assumed for this factor.

The t-test results indicated that *a statistical significant difference* ($p = 0.075$) exists between married/living together with a partner respondents, and single respondents, with regards to *selection practices* at the 10% level of significance.

The t-test results indicated that *no statistical significant differences* (all p values > 0.10) exist between the married/living together with a partner respondents, and single respondents, with regards to *evaluation, training, compensation, communication, socialisation and supply chain practices* at the 10% level of significance.

5.8.2 GENDER

The Mann-Whitney U test is a non-parametric statistical technique (Milenovic, 2010: 73). The author stated that the Mann-Whitney U test can be utilised for the following reasons:

- It is used to analyse differences between the medians of two data sets.
- It can be used in place of a t-test for independent samples in cases where the values within the sample do not follow the normal, or t-distribution, but also when the distribution of values is unknown.
- It is used when the group sample sizes are small or when the data is ordinal.

The hypotheses regarding gender were:

H₀: There is no difference between males and females with regards to their level of agreement regarding the selection/ evaluation/ training/ compensation/ communication/ socialisation and supply chain management practices.

H₁: There is a difference between male and female with regards to their level of agreement regarding selection/ evaluation/ training/ compensation/ communication/ socialisation and supply chain management practices.

Each practice was tested separately.

Table 5.21: Test statistics for gender

Test Statistics ^a							
	Selection	Evaluation	Training	Compensation	Communication	Socialisation	Supply ChainImp
Mann-Whitney U	380.000	362.500	390.000	376.000	321.500	388.000	249.500
Asymp. Sig. (2-tailed)	0.765	0.571	0.883	0.718	0.232	0.861	0.022

The results indicated that there are *no statistical significant differences*, at the 5 % level of significance between males and females with regards to *selection, evaluation, training, compensation, communication and socialisation practices* (all p values > 0.05).

The results indicated that there is a *statistical significant difference*, at the 5 % level of significance between males and females with regards to *importance of supply chain management* (p= 0.022). Furthermore, the mean ranks indicate that the female group tends to agree more with regards to *importance of supply chain management* (mean rank = 41.32) than the male group (mean rank = 29.31).

5.8.3 FUNCTIONAL AREA

The Kruskal-Wallis (KW) test is a non-parametric test that makes no assumption about the distribution of the variable in the population (Sedgwick, 2014:1). The KW test was conducted to determine if there is a significant difference between the responses of the different respondent groups as per profile, for example: the functional area, the management level (section 5.6.5) and the educational level (section 5.6.6) with regards to the different HR element and SCM practices. The KW test was conducted to determine if there is a significant difference between the responses of the respondents in four different functional areas such as: (1) marketing/ sales/ services; (2) operation level purchasing staff/ operation/ engineering/ technical; (3) supply chain managers/ line managers/ accounts/ finance; (4) purchasing/ procurement/ stores; (5) in supply chain with regards to the different HR elements and SCM practices.

Table 5.22: Test statistics for functional area

Test Statistics ^{a,b}							
	Selection	Evaluation	Training	Compensation	Communication	Socialisation	Supply ChainImp
Kruskal-Wallis H	4.061	4.083	0.581	3.937	3.291	3.175	2.783
Df	3	3	3	3	3	3	3
Asymp. Sig.	0.255	0.253	0.901	0.268	0.349	0.365	0.426

a. Kruskal Wallis Test

b. Grouping Variable: FunctionalArea

The results indicated that there is *no statistical significant difference*, at the 5 % level of significance between the responses of *functional groups* such as: marketing / sales / services, operation level purchasing staff/ operations / engineering / technical, supply chain managers/ line managers/ accounts / finance and purchasing/ procurement/ stores in supply chain with regards to *selection* (p = 0.255), *evaluation* (p= 0.253), *training* (p= 0.253), *compensation* (p= 0.268), *communication* (p= 0.349), *socialisation* (p= 0.365) and *supply chain practices* (p= 0.426). It thus indicates that the functional group a respondent belongs to does not influence their perceptions regarding HRM practices considered, and the importance of the supply chain practices areas.

5.8.4 MANAGEMENT LEVEL

The KW test was conducted to determine if there is a significant difference between the responses of the respondents on different management levels junior (1), middle (2) senior (3) and non-manager (5) with regards to different HR elements and SCM practices. The executive level responses were too small (n= 1) to be considered as a group that could be included for testing.

Table 5.23: Test statistics for management level

Test Statistics ^{a,b}							
	Selection	Evaluation	Training	Compensation	Communication	Socialisation	SupplyChainImp
Kruskal-Wallis H	3.137	2.294	2.955	3.818	0.962	3.651	0.721
Df	3	3	3	3	3	3	3
Asymp. Sig.	0.371	0.514	0.399	0.282	0.810	0.302	0.868

a. Kruskal Wallis Test

b. Grouping Variable: MNGMNT_LEVELADJ

The results indicated that there are *no statistical significant differences*, at the 10 % level of significance between *management levels*' (junior, middle, senior and non-manager) response with regard to *selection* (p= 0.371), *evaluation* (p= 0.514), *training* (0.399), *compensation* (p= 0.282), *communication* (p= 0.810), *socialisation* (p= 0.302) and *supply chain practices* (p= 0.868). It hence shows that the management level a respondent belongs to does not influence their perceptions regarding the HRM practices and the importance of the supply chain practices areas.

5.8.5 EDUCATION

The KW test was conducted to determine if there is a significant difference between the response of the respondents on different educational levels with regards to different HR elements and SCM practices.

Table 5.24: Test statistics for education

Test Statistics ^{a,b}							
	Selection	Evaluation	Training	Compensation	Communication	Socialisation	SupplyChainImp
Kruskal-Wallis H	0.955	0.442	0.159	5.263	2.598	1.518	4.343
Df	2	2	2	2	2	2	2
Asymp. Sig.	0.620	0.802	0.923	0.072	0.273	0.468	0.114

a. Kruskal Wallis Test

b. Grouping Variable: Education

The results indicated that there are *no statistical significant differences*, at the 10 % level of significance between *educational levels*’ (matric/ Gr12, tertiary diploma/ certificate and bachelor degree) responses with regards to *selection* (p= 0.620), *evaluation* (0.802), *training* (p= 0.923), *communication* (p= 0.273), *socialisation* (p= 0.468) and *supply chain practices* (p= 0.114).

The results indicated that there *is a statistical significant difference*, at the 10 % level of significance between *educational levels*’ (matric/ Gr12, tertiary diploma/ certificate and bachelor degree) responses with regards to *compensation* (p = 0.072). Furthermore, the mean ranks indicate that the higher educated (bachelor degree) group tends to agree more with regards to *compensation* (mean rank = 34.34) than the tertiary diploma/certificate (mean rank= 33.14) and the matric/G12 group (mean rank= 23.54).

5.9 CORRELATION ANALYSIS

Correlation is a statistical method used to assess a possible linear association between two continuous variables (Mukaka, 2012: 70). Furthermore, there are two main types of correlation

coefficients: Pearson's product moment correlation coefficient and Spearman's rank correlation coefficient. The most frequently used measure of relationships is the Pearson product moment correlation (also known as Pearson's coefficient), represented by the letter r , followed by symbols representing the variables being correlated (Field, 2009: 204). To determine the relationships amongst the variables, Pearson's correlation of coefficient was employed in this study. The Pearson's coefficient is defined as the ratio of the covariance of two variables, representing a set of numerical data, normalised to the square root of their variance (Hall, 2015: 2). A value of +1 represents a perfect positive correlation. This means that the two variables are precisely positively related, and that, as values of one variable increases, values of the other variable will increase (Saunders, *et al.*, 2009: 459). In addition to that, by contrast, a value of -1 represents a perfect negative correlation. Again, this means that the two variables are precisely related; however, as the values of one variable increases, those of the other decreases. Laerd Statistics (2018) offer guidelines for interpretation of a correlation coefficient in **table 5.25** below:

Table 5.25: Guidelines for interpretation of a correlation coefficient

Coefficient, r		
Strength of association	Positive	Negative
Small	.1 to .3	-0.1 to -0.3
Medium/Moderate	.3 to .5	-0.3 to -0.5
Large/Strong	.5 to 1.0	-0.5 to -1.0

Source: Laerd Statistics, 2018.

In this study, correlation coefficients between each of the elements of HRM, and the importance of SCM practices, were calculated to determine the strength and direction of the relationship. As a result, a correlation matrix is presented in **table 5.26**.

Table 5.26: Correlation matrix

Correlations								
		Selection	Evaluation	Training	Compensation	Communication	Socialisation	SupplyChainImp
Selection	Pearson Correlation	1	.631**	.593**	.566**	.487**	.647**	.581**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
	N	71	71	71	71	71	71	71
Evaluation	Pearson Correlation		1	.661**	.559**	.614**	.657**	.639**
	Sig. (2-tailed)			0.000	0.000	0.000	0.000	0.000
	N		71	71	71	71	71	71
Training	Pearson Correlation			1	.466**	.459**	.604**	.684**
	Sig. (2-tailed)				0.000	0.000	0.000	0.000
	N			71	71	71	71	71
Compensation	Pearson Correlation			.466**	1	.520**	.726**	.478**
	Sig. (2-tailed)			0.000		0.000	0.000	0.000
	N			71	71	71	71	71
Communication	Pearson Correlation					1	.585**	.700**
	Sig. (2-tailed)						0.000	0.000
	N					71	71	71
Socialisation	Pearson Correlation						1	.664**
	Sig. (2-tailed)							0.000
	N						71	71
SupplyChainImp	Pearson Correlation							1
	Sig. (2-tailed)							
	N							71

** . Correlation is significant at the 0.01 level (2-tailed).

The results indicate that there is a statistically significant, but *moderate* relationship, between *supply chain management implementation* and *selection* ($r= 0.581$, $p< 0.01$); a statistically significant, and *strong* positive relationship, between *supply chain management implementation* and *evaluation* ($r= 0.639$, $p< 0.01$); a statistically significant, and strong relationship, between *supply chain management implementation* and *training* ($r= 0.684$, $p< 0.01$); a statistically significant, but *moderate* relationship, between *supply chain management implementation* and *compensation* ($r= 0.478$, $p< 0.01$); a statistically significant and *strong* positive relationship between *supply chain management implementation* and *communication* ($r= 0.700$, $p< 0.01$); a statistical significant, and strong relationship, between *supply chain management implementation* and *socialisation* ($r= 0.664$, $p< 0.01$). The analysis showed that out of six human resource practices, four of the human resource management variables show a strong and positive significant relationship to supply chain management implementation; while two show a moderate and positive significant relationship to supply chain management implementation. This shows that the automotive manufacturer's HR practices selection, training, communication and socialisation correlate in line with the importance they rated to supply chain management. This also indicates that the automotive manufacturer's practices selection and compensation correlate at a moderate level.

The findings also show that there is a statistically significant, and *strong* positive relationship, between selection and evaluation ($r= 0.631$, $p<0.01$); a statistically significant, but *moderate* relationship, between selection and training ($r= 0.593$, $p<0.01$); a statistically significant, and strong positive relationship, between evaluation and training ($r= 0.661$, $p<0.01$); a statistically significant, but *moderate* relationship, between selection and compensation ($r= 0.566$, $p<0.01$); a statistically significant, but moderate relationship, between evaluation and compensation ($r= 0.559$, $p<0.01$); a statistically significant, but *moderate* relationship, between training and compensation ($r= 0.466$, $p<0.01$); a statistically significant, but *moderate* relationship, between selection and communication ($r= 0.487$, $p< 0.01$), a statistically significant and *strong* positive relationship between evaluation and communication ($r= 0.614$, $p<0.01$); a statistically significant, but *moderate* relationship, between training and communication ($r= 0.459$, $p<0.01$); a statistically significant, but moderate relationship, between compensation and communication ($r= 0.520$, $p<0.01$); a statistically significant, and *strong* positive relationship, between selection and

socialisation ($r = 0.647$, $p < 0.01$); a statistically significant, and *strong* positive relationship, between evaluation and socialisation ($r = 0.657$, $p < 0.01$); a statistically significant, and *strong* positive relationship, between training and socialisation ($r = 0.604$, $p < 0.01$); a statistically significant, and *strong* positive relationship, between compensation and socialisation ($r = 0.726$, $p < 0.01$); and a statistically significant, but *moderate* relationship, between communication and socialisation ($r = 0.585$, $p < 0.01$).

5.10 REGRESSION ANALYSIS

Regression analysis was conducted to determine which of the different HRM practices are statistically significant predictors of effective SCM implementation.

Table 5.27: Model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828 ^a	0.686	0.656	0.57206

a. Predictors: (Constant), Socialisation, Communication, Training, Selection, Compensation, Evaluation

Table 5.28: ANOVA

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	45.674	6	7.612	23.262	.000 ^b
	Residual	20.944	64	0.327		
	Total	66.618	70			

a. Dependent Variable: SupplyChainimp

b. Predictors: (Constant), Socialisation, Communication, Training, Selection, Compensation, Evaluation

The results of the model one indicated that:

- The adjusted R square result implies that 65.6 % of the variance in important supply chain management practices has been significantly explained by the six factors of HR practices.

- The significance of the F test for regression (testing that the beta coefficient does differ significantly from zero) also indicated statistical significance ($p < 0.01$).
- The standardised beta values and associated statistical significance, indicate that communication is the strongest statistical significant predictor of effective supply chain management implementation followed by socialisation and training.

Therefore, it is evident that communication, socialisation and training were statistically significant predictors of effective supply chain management implementation. As indicated in section 3.9.1, literature findings on HRM and SCM confirmed the following points:

- Adequate communication is the key to an effective and robust supply chain management.
- Socialisation can reinforce the implementation of effective supply chain management.
- Training can enhance the implementation of effective supply chain management.

It is clear that the implementation of effective supply chain management is highly dependent upon HRM practices which were validated by Vlerick Business School (2012) and UNICEF (2015).

Table 5.29: Coefficients

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.665	0.281		2.365	0.021
	Selection	0.072	0.095	0.077	0.758	0.451
	Evaluation	0.016	0.126	0.014	0.126	0.900
	Training	0.280	0.080	0.351	3.501	0.001
	Compensation	-0.138	0.110	-0.132	-1.257	0.213
	Communication	0.421	0.095	0.418	4.449	0.000
	Socialisation	0.235	0.118	0.244	1.997	0.050

a. Dependent Variable: SupplyChainImp

5.10.1 HYPOTHESIS TESTING

Hypotheses are tested by comparing the researcher's educated guess with empirical reality (Zikmund, *et al.*, 2010: 510). The summary of results of the hypotheses examined in this study is given in **table 5.30**.

Table 5.30: Summary of hypothesis testing results based on the regression analysis

	Hypothesis	Results
H.1	Human resources <i>selection</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Not supported
H.2	Human resources <i>evaluation</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Not supported
H.3	Human resources <i>training</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Supported
H.4	Human resources <i>compensation</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Not supported
H.5	Human resources <i>communication</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Supported
H.6	Human resources <i>socialisation</i> practices have a positive effect on the implementation of supply chain management in the South African automotive manufacturer.	Supported

5.11 CONCLUSION

This chapter focused on the statistical analysis. Descriptive statistics were conducted to summarise each of the HRM practices and SCM issues using a combination of tabulated description (frequency tables), graphical description (stacked charts) and statistical commentary (discussion of the results). Explorative factor analysis were conducted on each of the six HRM practices and the supply chain practices/issues, using principal axis factoring as extraction method and promax as rotation method. Cronbach's alpha was employed to measure the reliability of the items used in this study. For the purpose of determining whether differences exist between the categories of the following demographic variables (marital status, gender, functional areas employed, management level and education) with regards to each of the HRM practices and the SCM importance, relevant parametric and non-parametric inferential statistical tests were conducted. Correlation coefficients between each of the elements of HRM and the importance of SCM practices were calculated to determine the strength and direction of the relationship. Lastly, regression analysis was conducted to determine which of the different HRM practices are statistically significant predictors of effective SCM implementation. The next chapter deals with the findings, summary and recommendations.

CHAPTER 6

FINDINGS, SUMMARY AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter focuses on the research findings and recommendations. It provides the aim, a review of the research question and objectives and then answers/achieves them. This will then be followed by the findings of the study, the summary of the demographical information, the link of the literature study and the objectives to the data findings in the study, the summary of key findings: descriptive statistics, inferential statistics and finally regression analysis. The descriptive statistical findings highlight the areas in which the participating automotive manufacturer could consider improving which form the basis of the recommendations. The chapter will then end with the limitations of the study, the areas for future research and concluding remarks.

6.2 AIM OF THE STUDY, RESEARCH QUESTIONS AND OBJECTIVES

6.2.1 AIM OF THE STUDY

The main aim of the study was to determine whether a South African automotive manufacturer implements identified human resources practices, and to establish to what extent these practices enhance effective supply chain management implementation. The study aimed to provide recommendations on the adoption of human resource management practices for the purpose of facilitating the implementation of effective supply chain management.

6.2.2 RESEARCH QUESTION

The research question, which can also be regarded as a problem statement, as formulated in Chapter 1, was:

To what degree is a South African automotive manufacturing organisation adopting applicable human resource management practices to facilitate the implementation of effective supply chain management?

For the purpose of answering this research question, research objectives have been set. **Table 6.1** exhibits the link between the literature study and the objectives to the data findings in the study.

6.2.3 RESEARCH OBJECTIVES

6.2.3.1 Primary research objective

The primary research objective, as formulated in Chapter 1, was:

The primary objective of this study was to establish to what degree is a South African automotive manufacturer implementing effective (previously established) human resource management practices to facilitate the implementation of effective supply chain management.

6.2.3.2 Secondary research objectives

The secondary research objectives were:

- To determine whether *selection practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *evaluation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *training practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.

- To determine whether *compensation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *communication practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To determine whether *socialisation practices* in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.
- To identify which human resource practices *hinder* the implementation of effective supply chain management in the South African automotive manufacturing organisation.
- To determine whether differences exist between the categories of the following demographic variables: *marital status, gender, functional areas employed, management level and education*, with regards to each of the HRM practices and the SCM importance.

6.3 FINDINGS OF THE STUDY

As indicated in section 4.8.5.2, the questionnaire that was used to collect primary data for this study was divided into the following sections:

- Section A investigated how supply chain employees perceive the human resource practices within their organisation.

- Section B explored how supply chain employees perceive the importance of certain concerns to their organisation's supply chain management efforts.
- Section C consisted of the background information of the supply chain employees.

6.3.1 SUMMARY OF DEMOGRAPHICAL INFORMATION

- **Age:** The majority of the respondents were male, mostly aged between 26-35 years old, and almost half of the respondents indicated that they are married/living together. The modal category of the respondents' education was Matric/Gr12.
- **Work experience:** With regards to their employment history, most respondents had over 15 years' experience, and were at the organisation on an average of 6.2 years.
- **Functional area:** Almost 40 % (39.4 %) of the respondents who participated in the study were operation level purchasing staff/ operations/ engineering/ technical staff.
- **Management level:** A third (30 %) of the respondents (33.8 %) were non-managers.
- **Time in current job level:** The average time in the current job level was 4.02 years.

6.3.2 LINKING THE LITERATURE STUDY AND THE OBJECTIVES TO THE DATA FINDINGS IN THE STUDY

A literature review was undertaken to capture the importance of human resource management in supply chain management.

Linking the literature study and the objectives to the data findings in the study serves as a confirmation that the study objectives have been attained. **Table 6.1** exhibits this linking. The first

column lists the study objective, the second column the findings identified in this study and finally the last column the applicable section of the literature study.

Table 6.1: Linking the literature study and the objectives to the data findings in the study

Objectives	Findings	Applicable section
1. To establish to what degree is a South African automotive manufacturer implementing effective (previously established) human resource management practices to facilitate the implementation of effective supply chain management.	<ul style="list-style-type: none"> The results from the descriptive statistics of the main factors showed that selection is moderately practised in the organisation (mean= 3.1596, SD= 1.04480), along with evaluation (mean= 3.3239, SD= 0.87769), training (mean= 3.3239, SD= 1.22146), and communication (mean= 3.0469, SD= 0.96986). Compensation is poorly practised in the organisation (mean= 2.1525, SD= 0.93367) along with socialisation (mean= 2.7782, SD= 1.01291). 	5.7.10
2. To determine whether <i>selection practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>positive moderate</i> and <i>statistically significant</i> relationship between <i>supply chain management implementation</i> and <i>selection</i>. 	5.9
3. To determine whether <i>evaluation practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>strong positive</i> and <i>statistically significant</i> relationship between <i>supply chain management implementation</i> and <i>evaluation</i>. 	5.9

4. To determine whether <i>training practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>strong positive</i> and statistically significant relationship between <i>supply chain management implementation</i> and <i>training</i>. 	5.9
5. To determine whether <i>compensation practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>positive moderate</i> and statistically significant relationship between <i>supply chain management implementation</i> and <i>compensation</i>. 	5.9
6. To determine whether <i>communication practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>strong positive</i> and statistically significant relationship between <i>supply chain management implementation</i> and <i>communication</i> 	5.9
7. To determine whether <i>socialisation practices</i> in human resources enhances effective supply chain management implementation in the South African automotive manufacturing organisation.	<ul style="list-style-type: none"> The results from the correlational analysis showed that there is a <i>strong positive</i> and statistically significant relationship between <i>supply chain management implementation</i> and <i>socialisation</i> 	5.9
8. To identify which human resource practices <i>hinder</i> the implementation of effective supply chain management in the South African automotive manufacturing organisation.	<p>Identified weak HR practices:</p> <ul style="list-style-type: none"> Compensation Socialisation 	5.6.5 5.6.7

Source: Compiled by the researcher (2018)

It is evident from **table 6.1** that the primary and secondary objectives were addressed in the study. The next section will deal with the summary of key findings: descriptive statistical analysis.

6.3.3 SUMMARY OF KEY FINDINGS: DESCRIPTIVE STATISTICAL ANALYSIS

The descriptive statistical analysis addresses the secondary research objectives. The positive and negative groupings (agree or not agree) of responses (presented in the stack bar charts in Chapter 5) enlighten these findings. The next section (6.4.1) focuses on weak HR practices which might hinder the implementation of an effective supply chain management in the automotive manufacturer which needs attention.

6.3.3.1 Possible weak HR practices which might hinder the implementation of an effective supply chain management

6.3.3.1.1 Compensation

The majority of the respondents disagreed or strongly disagreed with all the statements C11: ‘this organisation pays employees well’; C12: ‘employees who perform above average in this organisation are paid more than the employees that perform averagely’; and C13: ‘employees are encouraged through creative reward strategies to be innovative’.

6.3.3.1.2 Socialisation

A third (33.8 %) of the respondents disagreed and strongly disagreed with statement S17: ‘in this organisation, the majority of managers and employees interact well’, underlining that not all employees perceive interaction between managers and employees as positive.

Over 50 % of the respondents strongly disagreed or disagreed with statements S18: ‘this organisation encourages socialisation methods like group conferences, multifunctional teams and

joint workshops for employees’; and S19: ‘this organisation encourages effective socialisation where employees are given the opportunity to share work related experience, knowledge, concerns, questions and solutions’, indicating that the automotive manufacturer does not make effective socialisation opportunities available between employees.

Furthermore, more than a third (35.2 %) strongly disagreed or disagreed with statement S20: ‘this organisation offers a positive working environment for employees’.

6.3.4 SUMMARY OF KEY FINDINGS: INFERENTIAL STATISTICS

The secondary objective was to determine whether differences exist between the categories of the following demographic variables: marital status; gender; functional areas employed; management level; and education, with regards to each of the HRM practices and the importance of SCM practices in the organisation.

Inferential statistics indicated that there were statistically significant differences between the categories of the following demographic variables with regards to each of the HRM practices and the SCM importance (see section 5.8):

- **Marital status:**

The t-test results indicated that *a statistical significant difference* exists between married/living together with a partner respondents, and single respondents, with regards to *selection practices*.

- **Gender:**

The results indicated that there is a *statistical significant difference* between males and females with regards to *importance of supply chain management*. Furthermore, the mean ranks indicate that the female group tends to agree more with regards to *importance of supply chain management*, than the male group.

- **Educational level:**

The results indicated that there *is a statistically significant difference* between *educational levels* (matric/ Gr12, tertiary diploma/ certificate and bachelor degree) responses with regards to *compensation*. Furthermore, the mean ranks indicate that the higher educated (bachelor degree) group tends to agree more with regards to *compensation*, than the tertiary diploma/certificate and the matric/G12 group.

However, there were no significant differences between the categories of the following demographic variables with regards to each of the HRM practices and the SCM importance (see section 5.8):

- **Functional groups:**

The results indicated that there is *no statistically significant differences* between the responses of *functional groups* such as: marketing / sales / services, operation level purchasing staff/ operations / engineering / technical, supply chain managers/ line managers/ accounts / finance and purchasing/ procurement/ stores in supply chain with regards to *selection, evaluation, training, compensation, communication, socialisation and supply chain practices*. It thus indicates that the functional group a respondent belongs to does not influence their perceptions regarding HRM practices considered and the importance of the supply chain practices.

- **Management levels:**

The results indicated that there are *no statistically significant differences* between *management levels* (junior, middle, senior and non-manager) responses with regards to *selection, evaluation, training, compensation, communication, socialisation and supply chain practices*. It hence shows that the management level a respondent belongs

to does not influence their perceptions regarding the HRM practices and the importance of the supply chain practices areas.

The next section will deal with the summary of key findings: regression analysis.

6.3.5 SUMMARY OF KEY FINDINGS: REGRESSION ANALYSIS

The results of the model indicated that the six HR factors explained a large portion of the variation in the importance of supply chain management practices. Furthermore, communication is the strongest statistical significant predictor of effective supply chain management implementation followed by socialisation and training.

The regression analysis was conducted for the purpose of determining which of the different HRM practices are statistically significant predictors of effective SCM implementation. Based on the findings, it is clear that communication, socialisation and training were statistical significant predictors of effective supply chain management implementation. As indicated in section 3.9.1 and section 5.10, literature findings on HRM and SCM have confirmed the following points:

- Adequate communication is the key to an effective and robust supply chain management.
- Socialisation can reinforce the implementation of effective supply chain management.
- Training can enhance the implementation of effective supply chain management.

However, selection, evaluation and compensation were not able to predict significantly on effective supply chain management implementation. Hence, the results in this study also support the hypothesis that HRM practices have significant bearing on the implementation of effective supply chain management.

Based on these areas of concern, stated in section 6.3.3.1, where improvements are needed, the next section makes recommendations.

6.4 RECOMMENDATIONS

The following recommendations are suggested in order to improving the HR practices of the South African automotive manufacturing organisation that participated in this research study.

6.4.1 RECOMMENDATION 1

Recommendation 1 concerns the following area for possible improvement:

1. (C11): This organisation pays employees well.
2. (C12): Employees who perform above average in this organisation are paid more than the employees that perform averagely.
3. (C13): Employees are encouraged through creative reward strategies to be innovative.

Section 2.7.2.4 underlines how important compensation is for the performance of the employees. This chapter also highlights the fact that when incentives are linked to the performance measures, it reinforces an employee's understanding that their contribution is important to the organisation's success. Section 3.9.1.3 points out that when the reward system can be perfectly aligned with an organisation's appraisal and evaluation, it can become an effective motivational method. This section also underlines how people undertake activities and adopt behaviours for which they are rewarded. They are motivated because they receive fair compensation and benefits

Based on these setions, the following is recommended:

The South African automotive manufacturer should set up compensation systems which ensure that compensation is comparable to what other employees for similar jobs elsewhere

are being paid. The organisation should also revise its current compensation system by including innovative and creative reward strategies in order to motivate their supply chain employees who perform above average.

This can be achieved by ensuring that the automotive manufacturer sets up compensation systems that take into consideration the employee's number of years with the organisation, years of experience, and education. In section 3.9.1.4, it was suggested that to arouse the enthusiasm of each node enterprise in a supply chain, and improve supply chain performance, a reasonable incentive mechanism in a supply chain is an effective way. The organisation should also align their compensation practice with performance to enhance the achievement of organisational goals and enhance competitive advantage. The organisation should also make use of performance metrics to determine rewards which are significantly related to satisfaction with supply chain performance. The automotive manufacturer should take into consideration these recommendations.

6.4.2 RECOMMENDATION 2

1. (S17): In this organisation, the majority of managers and employees interact well.
2. (S18): This organisation encourages socialisation methods like group conferences, multifunctional teams and joint workshops for employees.
3. (S19): This organisation encourages effective socialisation where employees are given the opportunity to share work-related experience, knowledge, concerns, questions and solutions.
4. (S20): This organisation offers a positive working environment for employees.

Section 2.7.1.6 highlighted that people enjoy working with those who are familiar or comfortable to work with. The productivity and performance level increases in a friendly transparent workplace. Section 3.9.1.6 highlighted that socialisation mechanisms such as team meetings, cross-functional teams, and joint workshops act to connect individuals across both parties, with

the resulting pattern of close interaction creating a network of interdependent social exchanges and increasing the level of mutual trust and respect across the development teams.

Based on these sections, the following is recommended:

The South African automotive manufacturer should provide a sociable, transparent and positive working environment for its workers. The organisation should also revise its actual socialisation mechanisms so that supply chain employees can liberally trade personal or specialised knowledge .

In section 3.9.1.6, it was mentioned that the lack of socialisation has been identified as a key issue in many supply chains. It was recommended that the most advanced approaches, in terms of supply chain management, start by integrating the importance of social ties in order to understand how business relationships develop. The automotive manufacturer should take into account this suggestion. In section 3.9.1.6, it was recommended that an organisation that strives for supply chain excellence should make efforts to provide the most suitable platform to foster desired socialisation. In section 2.7.1.6, it was mentioned that the majority of specialists agree that unsuccessful socialisation results in job dissatisfaction, truancy and a negative socio-psychological climate which reduces work efficiency in an organisation. On the contrary, successful socialisation brings mutual benefits. The automotive manufacturer should take into account these suggestions.

6.5 LIMITATIONS OF THE STUDY

This study is limited to one leading automotive manufacturing organisation in South Africa. Therefore, the outcomes of this study cannot be generalised to the entire automotive manufacturing industry in South Africa.

6.6 FURTHER RESEARCH AREAS

While this study *firstly* focused attention on the important aspects of the impact of human resource management practices on effective supply chain management implementation on the research

agenda in South Africa, and *secondly*, contributed to insights into human resource aspects of supply chain management, which were identified as a weakness in the South African automotive manufacturing organisation. This study could be extended to all South African automotive manufacturers. This could provide insights on additional weak HR practices and how the South African automotive manufacturers manage these identified weak HR practices which might hinder the implementation of effective supply chain management.

6.7 CONCLUDING REMARKS

This study was conducted in one leading South African automotive manufacturing organisation. This study investigated the degree to which the participating South African automotive manufacturing organisation adopts applicable human resource management practices to facilitate the implementation of effective supply chain management. Based on the results of descriptive statistics addressed in chapter 5 (section 5.6), it is evident that the automotive manufacturing organisation utilises HR practices to a moderate level to enhance the implementation of supply chain management.

No studies were previously done in South Africa to determine the link between human resource management (HRM) and the successful implementation of supply chain management. This study has the following significance: (1) to focus attention on the important aspect of the impact of human resource management practices on effective supply chain management implementation on the research agenda in South Africa; and (2) to contribute to insights into human resource aspects of supply chain management, which were identified as a weakness in South Africa.

The findings of this study indicate that HRM and SCM functions are on average well practiced in the automotive manufacturing organisation. This study found that HRM practices such as selection, evaluation, training and communication were key elements for the implementation of an effective supply chain management. Therefore, as indicated in section 5.10, it is evident that the implementation of an effective supply chain management is highly dependent upon HRM practices which were validated by Vlerick Business School (2012) and UNICEF (2015). However, HR

practices such as compensation and socialisation were poorly practiced by the automotive manufacturer which therefore hinders the implementation of effective supply chain management.

HR practices have become crucial and many organisations have come to that realisation. As indicated in section 3.8, numerous studies have reported some significant improvements and benefits in terms of their performance when applying purposeful HR practices to their supply chains. As shown in **table 3.8** in chapter 3, the study of Khan *et al.* (2013) found that HRM practices such as training, compensation and evaluation were the key factors for either supply chain success or failure in SME. The study of Menon (2012) found that HR practices, such as job descriptions and teamwork training, are important for successful supply chain integration. This is also relevant in the automotive industry where the successful implementation of effective supply chain management is highly dependent on the use of appropriate HR practices. Therefore, for the purpose of remaining competitive in the automotive industry, it is essential to reinforce the participating automotive manufacturing organisation's HR practices.

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APPENDIX A: RESEARCH QUESTIONNAIRE

TITLE: SUPPLY CHAIN MANAGEMENT: A HUMAN RESOURCE PERSPECTIVE IN A SOUTH AFRICAN AUTOMOTIVE MANUFACTURING ORGANISATION

SECTION A: Human resource practices:

The following statements relate to the way in which you as supply chain employee perceive the human resource practices within your organisation. Please indicate your level of agreement with each statement by marking an **X** in the appropriate box.

	1 Strongly Disagree	2 Disagree	3 Neither Agree nor Disagree	4 Agree	5 Strongly Agree
SELECTION					
1.	Workers in this organisation are selected based only on their competencies which are needed to attain organisational goals.				
2.	A range of assessment methods are utilised in the selection process to evaluate the abilities of the potential employees.				
3.	Only the right people with the right skills are selected to work in this organisation?				

	1 Strongly Disagree	2 Disagree	3 Neither Agree nor Disagree	4 Agree	5 Strongly Agree
EVALUATION					

11.	This organisation pays employees well.					
12.	Employees who perform above average in this organisation are paid more than the employees that perform averagely.					
13.	Employees are encouraged through creative reward strategies to be innovative.					

	1	2	3	4	5
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
COMMUNICATION					
	1	2	3	4	5
14.	Employees in this organisation effectively collaborate across functional areas.				
15.	There is effective communication among organisation employees in this organisation.				
16.	This organisation's employees communicate effectively with its external supply chain partners (suppliers and customers).				

	1	2	3	4	5
	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
SOCIALISATION					
	1	2	3	4	5
17.	In this organisation, the majority of managers and employees interact well.				

18.	This organisation encourages socialisation methods like group conferences, multifunctional teams and joint workshops for employees.					
19.	This organisation encourages effective socialisation where employees are given the opportunity to share work related experience, knowledge, concerns, questions and solutions.					
20.	This organisation offers a positive working environment for employees.					

SECTION B: Supply Chain

Please indicate **the importance of each of the following issues/concerns to the organisation's supply chain management efforts** on a five-point scales with endpoints "of no importance at all and of extreme importance".

		1	2	3	4	5
		Of no Importance	Of minor Importance	Of moderate Importance	Of Large/ High Importance	Of extreme Importance
SUPPLY CHAIN MANAGEMENT						
		1	2	3	4	5
21.	Every employee in SCM sees his/her work as part of a system (organization, supply chain or value chain), thereby contributing to the overall effectiveness and performance of the broader system					
22.	Information technology integrate and coordinate processes in the supply chain					
23.	Good relationships between individuals in the SCM function, between functions and different levels					
24.	Every employee in SCM be flexible, responsive and innovative in changing circumstances					

25.	Good long term relationships with important suppliers and customers, based on trust					
26.	Technical skills of employees in SCM					
27.	Interpersonal skills of employees in SCM					
28.	Analytical skills (problem solving) of employees in SCM					
29.	Business knowledge and skills of employees in SCM					
30.	Cost saving as performance element					
30.	Balance in the elements of service, quality, and cost as performance evaluation elements					

Section C: General Information

What is your job title? _____

How long, in years, have you been with this organisation? If less than one year, please indicate months _____

How long in years, have you been working in your current position? If less than one year, please indicate months _____

Please indicate your demographic profile by marking the appropriate box:

Age	Highest level of Education	Marital Status	Total years of work experience
<input type="checkbox"/> 20-25 years	<input type="checkbox"/> <input type="checkbox"/> Matric/ Gr12	<input type="checkbox"/> <input type="checkbox"/> Married/ Living together with a partner	<input type="checkbox"/> Less than a year
<input type="checkbox"/> 26-30 years	<input type="checkbox"/> <input type="checkbox"/> Tertiary diploma/	<input type="checkbox"/> Single	<input type="checkbox"/> <input type="checkbox"/> 1-3 years

	certificate		
<input type="checkbox"/> 31-35 years	<input type="checkbox"/> Bachelor degree		
<input type="checkbox"/> 36-40 years	<input type="checkbox"/> Honors degree	Gender	<input type="checkbox"/> 7-9 years
<input type="checkbox"/> 41-45 years	<input type="checkbox"/> Master's degree	<input type="checkbox"/> Male	<input type="checkbox"/> 10-12years
<input type="checkbox"/> 46-50 years	<input type="checkbox"/> Doctorate	<input type="checkbox"/> Female	<input type="checkbox"/> 13-15 years
<input type="checkbox"/> Over 50 years	<input type="checkbox"/> Other (Please specify)		<input type="checkbox"/> Over 15 years

Please indicate your functional area as well as your management level:

Functional area	Management Level
<input type="checkbox"/> General Management	<input type="checkbox"/> Junior
<input type="checkbox"/> Marketing / Sales / Services	<input type="checkbox"/> Middle
<input type="checkbox"/> Operation level purchasing staff/ Operations / Engineering / Technical	<input type="checkbox"/> Senior
<input type="checkbox"/> Supply chain managers/ Line managers/ Accounts / Finance	<input type="checkbox"/> Executive
<input type="checkbox"/> Purchasing/ Procurement/ Stores	<input type="checkbox"/> Non-manager

APPENDIX B: Mann-Whitney Test for gender

Table 5.29: Mann-Whitney Test for gender

Mann-Whitney Test				
Ranks				
gender_adj		N	Mean Rank	Sum of Ranks
Selection	1.00	47	32.09	1508.00
	2.00	17	33.65	572.00
	Total	64		
Evaluation	1.00	47	33.29	1564.50
	2.00	17	30.32	515.50
	Total	64		
Training	1.00	47	32.70	1537.00
	2.00	17	31.94	543.00
	Total	64		
Compensation	1.00	47	32.00	1504.00
	2.00	17	33.88	576.00
	Total	64		
Communication	1.00	47	30.84	1449.50
	2.00	17	37.09	630.50
	Total	64		
Socialisation	1.00	47	32.26	1516.00
	2.00	17	33.18	564.00
	Total	64		
SupplyChainImp	1.00	47	29.31	1377.50
	2.00	17	41.32	702.50
	Total	64		

APPENDIX C: Kruskal-Wallis Test for functional area

Table 5.30: Kruskal-Wallis Test for functional area

Kruskal-Wallis Test			
Ranks			
FunctionalArea		N	Mean Rank
Selection	2	7	18.50
	3	28	30.82
	4	7	34.57
	5	15	27.90
	Total	57	
Evaluation	2	7	17.29
	3	28	30.30
	4	7	31.71
	5	15	30.77
	Total	57	
Training	2	7	28.43
	3	28	29.45
	4	7	24.86
	5	15	30.37
	Total	57	
Compensation	2	7	28.21
	3	28	29.86
	4	7	38.14
	5	15	23.50
	Total	57	
Communication	2	7	23.21
	3	28	28.88
	4	7	23.57
	5	15	34.47
	Total	57	
Socialisation	2	7	19.36

	3	28	31.70
	4	7	29.64
	5	15	28.17
	Total	57	
SupplyChainImp	2	7	23.14
	3	28	29.29
	4	7	23.71
	5	15	33.67
	Total	57	

APPENDIX D: Kruskal-Wallis Test for education

Table 5.31: Kruskal-Wallis Test for education

Kruskal-Wallis Test			
Ranks			
Education		N	Mean Rank
Selection	1	24	29.10
	2	18	27.17
	3	16	32.72
	Total	58	
Evaluation	1	24	27.81
	2	18	30.25
	3	16	31.19
	Total	58	
Training	1	24	30.06
	2	18	30.00
	3	16	28.09
	Total	58	
Compensation	1	24	23.54
	2	18	33.14
	3	16	34.34
	Total	58	
Communication	1	24	25.85
	2	18	29.89
	3	16	34.53
	Total	58	
Socialisation	1	24	26.33
	2	18	31.03
	3	16	32.53
	Total	58	
SupplyChainImp	1	24	24.27
	2	18	31.44

	3	16	35.16
	Total	58	

APPENDIX E: Kruskal-Wallis Test for management level

Table 5.32: Kruskal-Wallis Test for management level

Kruskal-Wallis Test			
Ranks			
MNGMNT_LEVELADJ		N	Mean Rank
Selection	1.00	12	21.04
	2.00	9	26.78
	3.00	7	33.43
	5.00	24	27.10
	Total	52	
Evaluation	1.00	12	21.13
	2.00	9	28.94
	3.00	7	25.36
	5.00	24	28.60
	Total	52	
Training	1.00	12	28.42
	2.00	9	20.28
	3.00	7	22.50
	5.00	24	29.04
	Total	52	
Compensation	1.00	12	19.83
	2.00	9	31.56
	3.00	7	30.07
	5.00	24	26.90
	Total	52	
Communication	1.00	12	29.04
	2.00	9	25.33
	3.00	7	22.29
	5.00	24	26.90
	Total	52	

Socialisation	1.00	12	19.46
	2.00	9	26.44
	3.00	7	29.93
	5.00	24	29.04
	Total	52	
SupplyChainImp	1.00	12	28.04
	2.00	9	28.00
	3.00	7	22.43
	5.00	24	26.35
	Total	52	